Modems

DCAA/68 STANDALONE
Model 4712
Installation and Operation

Document No. 862-6757-M20-02

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PARADYNE Technical Update Memo (1 of 2)

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Standalone Unit Model 4712
Installation and Operation Manual

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INSTRUCTIONS

This update provides replacement pages for the affected document. Replace and add pages as follows:

Replace		Add
i	2-5	Appendix B
ii	2-8	
iii	2-12	
1-2	2-13	
1-3	2-14	
1-5	2-16	
1-7		

If you are inserting pages from more than one Technical Update Memo and identical page numbers are involved, always use the pages from the most recent Technical Update Memo. The most recent change page can be identified by the affected document number at the top of each page that is changed. Each change page contains a dash number immediately after the affected document number. The higher dash number represents the more up-to-date change page.

Technical changes to the text or illustrations are indicated by a vertical bar to the left or right of the change as appropriate. Deletions are indicated by a vertical bar outline where the omission occurs. A vertical bar next to the page number indicates a movement of information from the preceding or to the following page.

NOTE

After inserting appropriate pages, please file this cover sheet at the back of the document to provide a record of changes, and write this Technical Update Memo number on the front cover of the document in the space provided.

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PURPOSE OF CHANGE

This Technical Update Memo makes the following significant changes to the affected document.

1. Adds references to MPX 4800RD DCAA, Feature 2748-018, to text.

2. Corrects Figures 2-6 and 2-7 which were exchanged in -01 Technical Update Memo.

3. Adds Appendix B that describes installation and cabling of the DCAA/68 for the MPX 4800 Modem.

PREFACE

This manual contains installation, operation, and maintenance information for the Dual Call Auto Answer (DCAA/68) Standalone Unit, Model 4712. The DCAA has been approved for direct connection to the Public Switched Telephone Network by the Federal Communications Commission (FCC) Rules, Volume X, Part 68.

Registration Number is AW292J-70304-DP-E
Ringer Equivalence is 0.3B.

Refer to Paragraph 1.2, NOTICE TO USERS, for additional information.

RELATED DOCUMENTS

836-4200-M40	MP96 Modem, Model 2496, Installation, Operation and Maintenance Manual
847-5600-M20	MP96RP Modem, Model 2498, Installation and Operation Manual
859-2698-M20	MP144 Modem, Model 2698, Installation and Operation Manual
857-6700-M20	MP160 Modem, Model 2699, Installation and Operation Manual
866-6600-M20	MPX4800 Modem, Model 2748, Installation and Operation Manual
866-6603-S20	DMC Diagnostic Microcomputer, Feature 2748-004, Installation and Operation Supplement
2748-A2-GN31	MPX Modem Series, Installation and Operation Manual

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Figure 1-1. Dual Call Auto Answer (DCAA/68) Standalone Unit, Model 4712

CHAPTER 1

INTRODUCTION

1.1 GENERAL

The Dual Call Auto Answer (DCAA/68) Model 4712, shown in Figure 1-1, is a standalone unit, containing an internal dc power supply, designed to connect data communications equipment (DCE) to the switched telephone network. It operates with four-wire, full-duplex modems and provides point-to-point or multipoint connected modems with dial network backup in the event of loss or degradation of their leased lines. The unit operates in four-wire full-duplex applications over two dial lines, but does not operate in two-wire, half-duplex over one dial line. Figure 1-2 is a typical system configuration. In addition, the unit provides these features:

- Internal Data Access Arrangement (DAA).
- Isolation of nonregistered customer equipment from the telephone network to protect the network and personnel from hazardous voltages and protection of customer equipment from surges occurring on the telephone network.
- Detection of incoming ringing signals to permit a unit to operate in an unattended automatic answering mode.
- Switching of transmission paths between dedicated and dial-backup lines.
- A two-second delay in giving the data equipment access to the telephone lines to permit proper operation of telephone company automatic billing equipment.

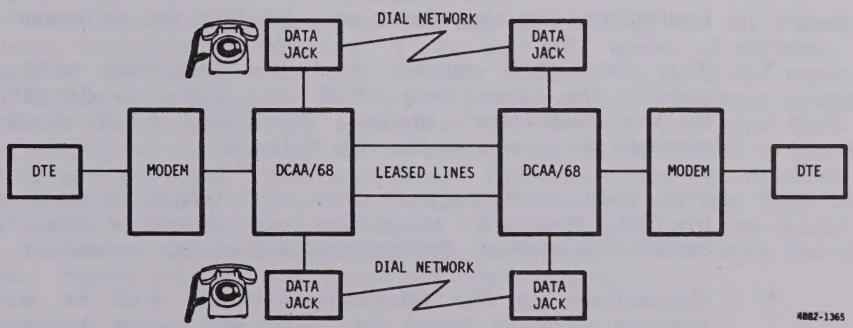


Figure 1-2. Typical System Configuration

- Automatic limiting of transmission signal power.
- Manual attenuator providing 0 to 15 db loss in the dial transmit power.
- Program attenuator control providing 0 to 12 db loss in the dial transmit power when programmed data jacks are used.
- Automatic disconnect after 15 seconds of silence in data transmission.
- L.E.D. monitoring of the status of significant signals in the calling and answering sequence.
- Programmable, Permissive, or FLL modes of operation.

DCAA Feature 2748-018 is a daughterboard and cable assembly that interfaces the DCAA/68 Model 4712 to the Diagnostic Microcomputer (DMC) circuit card (equipped with RD PROMs) in the MPX 4800 Modem (Appendix B).

1.2 NOTICE TO USERS

The unit meets the registration requirements of the Federal Communications Commission (FCC) Rules and Regulations, Volume X, Part 68. It has been granted registration number AW292J-70304-DP-E. The ringer equivalence is 0.3B.

The FCC has established rules which govern the direct connection of data couplers to the telephone network. Before connecting the unit to the network, the user must comply with the following rules:

- The telephone company shall be notified of each line to which connections are to be made and shall be provided with the above registration number and ringer equivalence. This registration number and ringer equivalence are also shown on a label on the equipment.
- The user shall request that the telephone company provide the appropriate USOC data jacks, as described in the installation section, Paragraph 2.8.3 of this manual, for access to the dial network.
- The user shall request that the telephone company provide standard telephones as described in the installation section, Paragraph 2.8.2 of this manual.
- Connections to the telephone network shall be made through standard keyed data plugs and cables furnished with the unit.
- The equipment may not be used with party line service or coin telephones.

The user shall give notice to the telephone company upon final disconnection of the equipment from the network lines.

Should the unit or terminal equipment malfunction while connected to the telephone network, the unit should be disconnected until the source of the problem can be determined and repairs made. If this is not done, the telephone company may notify the user that temporary discontinuance of service is required. Where prior notice is not practical, the telephone company may temporarily discontinue service forthwith, if such action is reasonable under the circumstances. In such case, the telephone company shall (1) promptly notify the user of such temporary discontinuance, (2) afford the user the opportunity to correct the situation which gave rise to the discontinuance, and (3) inform the user of his right to bring a complaint to the FCC pursuant to the procedures set forth in the Rules and Regulations, Part 68, Subpart E.

The telephone company may make changes in its communications facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any user's terminal equipment incompatible with the telephone company communications facilities, or to require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the user shall be given adequate notice, in writing, to allow the user an opportunity to maintain uninterrupted service.

Repair of the unit shall be accomplished only by the manufacturer or his authorized agent; however, preventive maintenance may be performed by a user in accordance with this manual. It is the responsibility of users requiring service to report the need for service to Paradyne Corporation or to one of its authorized agents. Unauthorized repair by the user could result in noncompliance with the FCC Rules and Regulations, Part 68, Subpart D.

1.3 FUNCTIONAL DESCRIPTION

The Auto Answer Unit provides two-call dial-backup for all Paradyne modems, including the MP, LSI, T, M, and MPX series of modems. It interfaces directly with the dial network without the need for separate data access arrangements (DAA's). It requires two telephone company installed data jacks at each location of the circuit. Two type 503C or 2503 telephones are required at the calling end of the circuit to provide dialing and alternate voice capability. Telephones are not required to receive data calls. The unit automatically answers two dial calls over two dial lines and switches the modem VF connections from the leased to the dial lines, thus allowing the modems to communicate over the dial lines. Figure 1-3 is a unit functional block diagram.

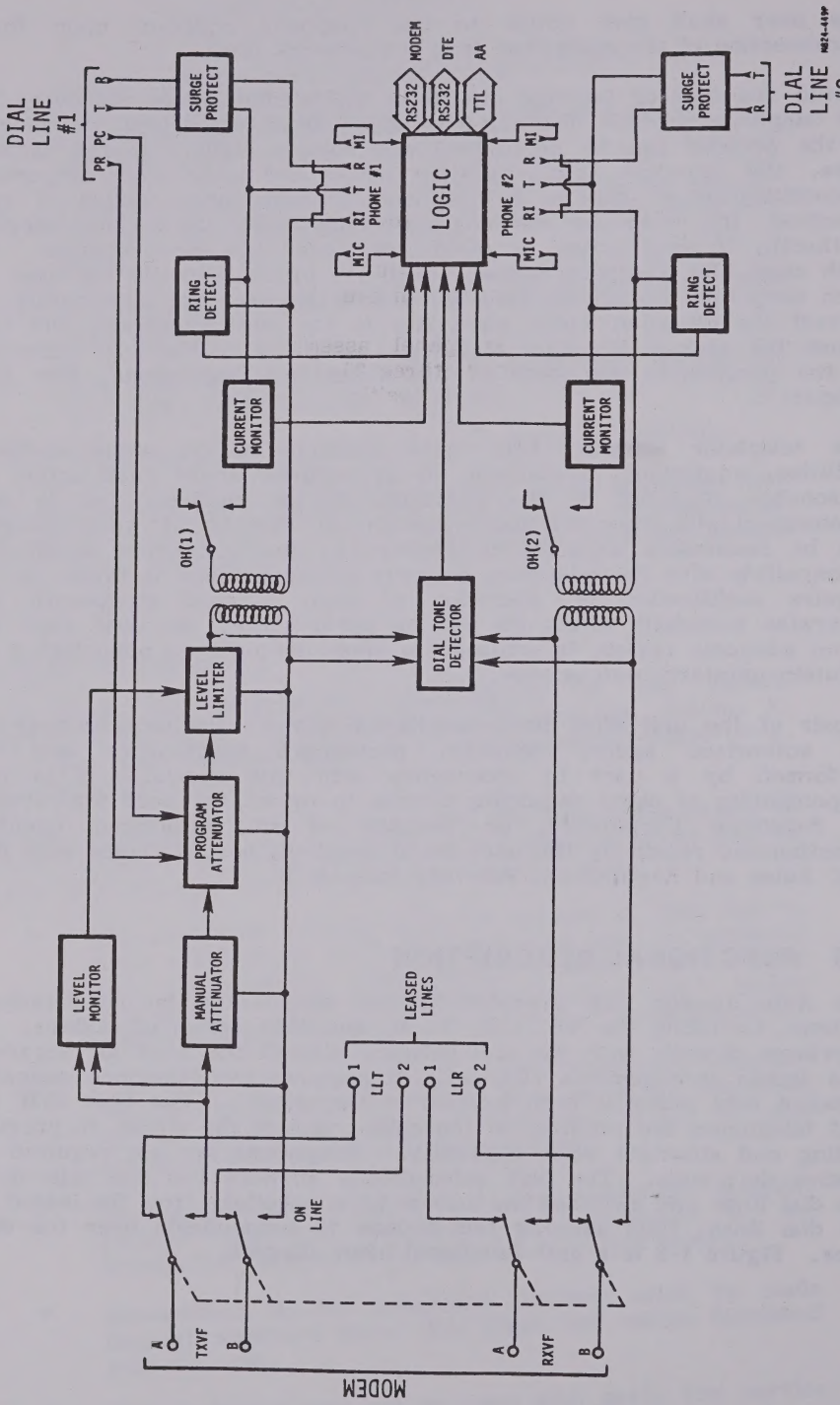


Figure 1-3. Functional Block Diagram

1.4 PHYSICAL DESCRIPTION

The auto answer unit is packaged in a free-standing injection molded plastic case with a removable top cover for easy access to the electronic circuits. The electronic circuitry is contained on a single 14-inch by 16-inch circuit card assembly with integral power supply. The unit is 17 inches (43.18 cm) wide, 3.6 inches (9.14 cm) high, 16.5 inches (41.91 cm) deep, and weighs 8.5 pounds (3.68 kg).

The front panel contains one pushbutton switch, one toggle switch, and twelve LED indicators described in Chapter 3, Operation.

The lower half of the rear panel assembly contains one ac line receptacle, one fuse/fuse holder, three 25-pin EIA-type connectors (one male and two female), and two 8-position telephone-type modular data jacks. The upper half of the rear panel contains two 8-position modular data jacks and two screw-type phone line terminal boards, containing four screw terminals each.

1.5 TECHNICAL SPECIFICATIONS

CONFIGURATION:
DCAA/68 Standalone Unit.

COMPATIBILITY:
Compatible with Paradyne MP, LSI, T, M, and MPX series of modems.

APPLICATIONS:
4-wire dial back-up.

NETWORK CONNECTIONS:
Programmable
Permissive
FLL

DIGITAL INTERFACE:
EIA RS232C
TTL

TELEPHONE LINE INTERFACE:
Two 8-position modular data jacks for connections to the telephone network via telephone company-supplied data jacks.

TELEPHONE CONNECTIONS:
Two 8-position modular data jacks for connections to two type 503 telephone sets.

REGISTRATION/APPROVALS:
UL approved.
FCC Part 68 approved.
FCC Part 15 compliant.

POWER REQUIREMENTS:

Voltage:
105 to 125 Vac, .105 amps.
Frequency:
47 to 63 Hz.
Power Consumption:
10 Watts.

ENVIRONMENTAL REQUIREMENTS:

Operating temperature:
0° to +50°C.
Relative Humidity:
5% to 95% (noncondensing).

PHYSICAL CHARACTERISTICS:

Width:
17 inches (43.18 cm).
Height:
3.6 inches (9.14 cm).
Depth:
16.5 inches (41.91 cm).
Weight:
8.5 pounds (3.68 Kgms).

1.6 EQUIPMENT SUPPLIED

The following list is a complement of equipment supplied. However, this list does not necessarily reflect the current revision level of the unit or any subassemblies supplied with the basic unit. Specific revisions that affect form, fit, or function are appropriately referenced within the manual.

Dual Call Auto Answer Unit/FCC Part 68 approved	
Model No. 4712-01	
DCAA/68 Standalone Unit Assembly	862-6757-0x11
Auto Answer Circuit Card Assembly/Power Supply	862-6760-5x61
• Fuse, 1/4 amp., 250V Slo-Blo	190-0006-0031
Cable Assembly, RS232, M-F, 10 feet	835-3564-1011
Cable Assembly, Programmable Mode	
• Standard 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (2 each)	125-0021-1431

1.7 EQUIPMENT OPTIONS

MP 144 Option Feature	
• DCAA/68 Standalone Unit	862-6757-0x11
• AA Option CCA (DTE Adapter #3)	859-3419-5x61
MP 96/MP 96 RP/MP 144A/MP 160 Option Feature	
• DCAA/68 Standalone Unit Assembly	862-6757-0x11
• Cable Assembly, Line (installed within modem assembly)	819-3044-8011
M 96/MP 48/LSI 24/LSI 96/T 96/MPX Option Feature	
• DCAA/68 Standalone Unit Assembly	862-6757-0x11
• Cable, VF, Modem to DCAA/68	034-0012-0031
Cable Assembly, (Permissive Mode) Standard 4-conductor telephone cable with miniature keyed 6-pin plugs on each end, 14 feet (2 each)	125-0025-0031
Cable Assembly, FLL Mode	
• Special 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (1 each)	125-0029-1431
• Standard 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (1 each)	125-0021-1431
Rack Mount Option	862-4680-0011
MPX 4800 Installation Feature	2748-018
• Interface Daughterboard	866-7796-8xxx
• Cable Assembly	819-3045-0111

1.8 EQUIPMENT ACCESSORIES

Telephone voice cable (replacement)	125-0030-0831

1.9 EQUIPMENT REQUIRED BUT NOT SUPPLIED

Telephones (2 each), Type 503C (dial) or 2503 (touch tone) with cables and these optional features:

Option A2--Data Set Controls Line
Option D8--Voice Mode Indication

2.6 EQUIPMENT INTERFACE CONNECTIONS

Interface connections to the data terminal equipment, modem, and phone lines vary with the configuration used. See Figure 2-4 for the location of the various interface connectors, Figure 2-5 for unit interconnection details, and Figures 2-6 and 2-7 for system configurations/connections.

The DTE connector and the MODEM connector described in the following paragraph are used to interconnect the unit with the DTE and the modem. These two connectors (DTE and MODEM) are used with all modems except the MP 96, MP 96 RP, MP 144, and MP 160. These latter modem types are interconnected to the auto answer unit through the AA connector.

2.6.1 DTE CONNECTOR

The DTE connector is a 25-pin female EIA-type connector, and it requires a standard male-to-female RS232 cable normally supplied with the DTE. Table 2-1 defines the interface connections at the DTE connector.

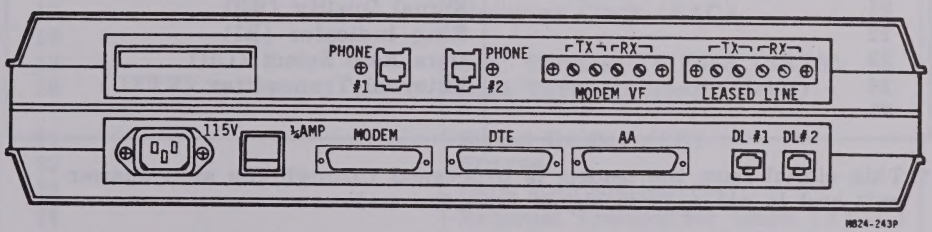


Figure 2-4. Rear Panel

Table 2-1. DTE Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground (FG)
2	Transmit Data (TXD)
3	Received Data (RXD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	*Data Set Ready (DSR)
7	Signal Ground (SG)
8	Line Signal Detect (LSD)
9	-
10	-
11	-
12	Sec. Line Sig. Detect (SLSD)
13	Sec. Clear To Send (SCTS)
14	Sec. Transmit Data (STXD)
15	Internal Transmit Clock (ITXC)
16	Sec. Received Data (SRXD)
17	Receiver Clock (RXC)
18	-
19	Sec. Request To Send (SRTS)
20	Data Terminal Ready (DTR)
21	Signal Quality (SQ)
22	Ring Indicator (RI)
23	Data Rate Select (CH)
24	External Transmitter (XTXC)
25	-

* This signal from the modem is processed through the auto answer unit and is not a True signal from the modem.

2.6.2 MODEM CONNECTOR

The MODEM connector is a 25-pin EIA-type connector which requires a standard male-to-female RS232 cable for connection to the modem DTE connector. This 10-foot cable, Paradyne part number 835-3564-1011, is supplied with the auto answer unit. Table 2-2 defines the interface definitions at the MODEM connector.

Table 2-2. MODEM Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground (FG)
2	Transmit Data (TXD)
3	Received Data (RXD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground (SG)
8	Line Signal Detect (LSD)
9	-
10	-
11	-
12	Sec. Line Sig. Detect (SLSD)
13	Sec. Clear To Send (SCTS)
14	Sec. Transmit Data (STXD)
15	Internal Transmit Clock (ITXC)
16	Sec. Received Data (SRXD)
17	Receiver Clock (RXC)
18	-
19	Sec. Request To Send (SRTS)
20	Data Terminal Ready (DTR)
21	Signal Quality (SQ)
22	*EDLOW
23	Data Rate Select (CH)
24	External Transmitter Clock (XTXC)
25	-

* See Paragraph 2.12, Strap Description 16.

2.6.3 AA CONNECTOR

This connector is used for interconnection to an MP 96, MP 96RP, MP 144, or MP 160 modem. It carries all auto answer/modem digital control signals and the TXVF and RXVF analog signals between the auto answer unit and the modem. For the above modems, this is the only connection made for digital and VF signals to and from the modem. Additionally, all digital signals through this connector are TTL levels except RSRI (Pin 22) which is RS-232 level.

The AA connector is a 25-pin female EIA-type connector, requiring a supplied standard male-to-female, 10-foot RS232 type cable, Paradyne part number 835-3564-1011, for connection to the modem AA connector. Table 2-3 defines the interface connections at the AA connector.

The MPX4800 Modem also uses the AA connector for all except the VF signals but requires a different cable (819-3045-0111) supplied with Feature 2748-018 (Appendix B).

Table 2-3. AA Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground
2	TXVFA
3	-
4	RTSA-0
5	RXVFA
6	AADSR-1
7	Signal Ground
8	LSDA-0
9	-
10	-
11	-
12	-
13	-
14	TXVFB
15	AANS-1
16	Signal Ground
17	RXVFB
18	-
19	-
20	DTRA-0
21	-
22	RSRI
23	AAIN-1
24	EDLOW-1
25	RDIN-0

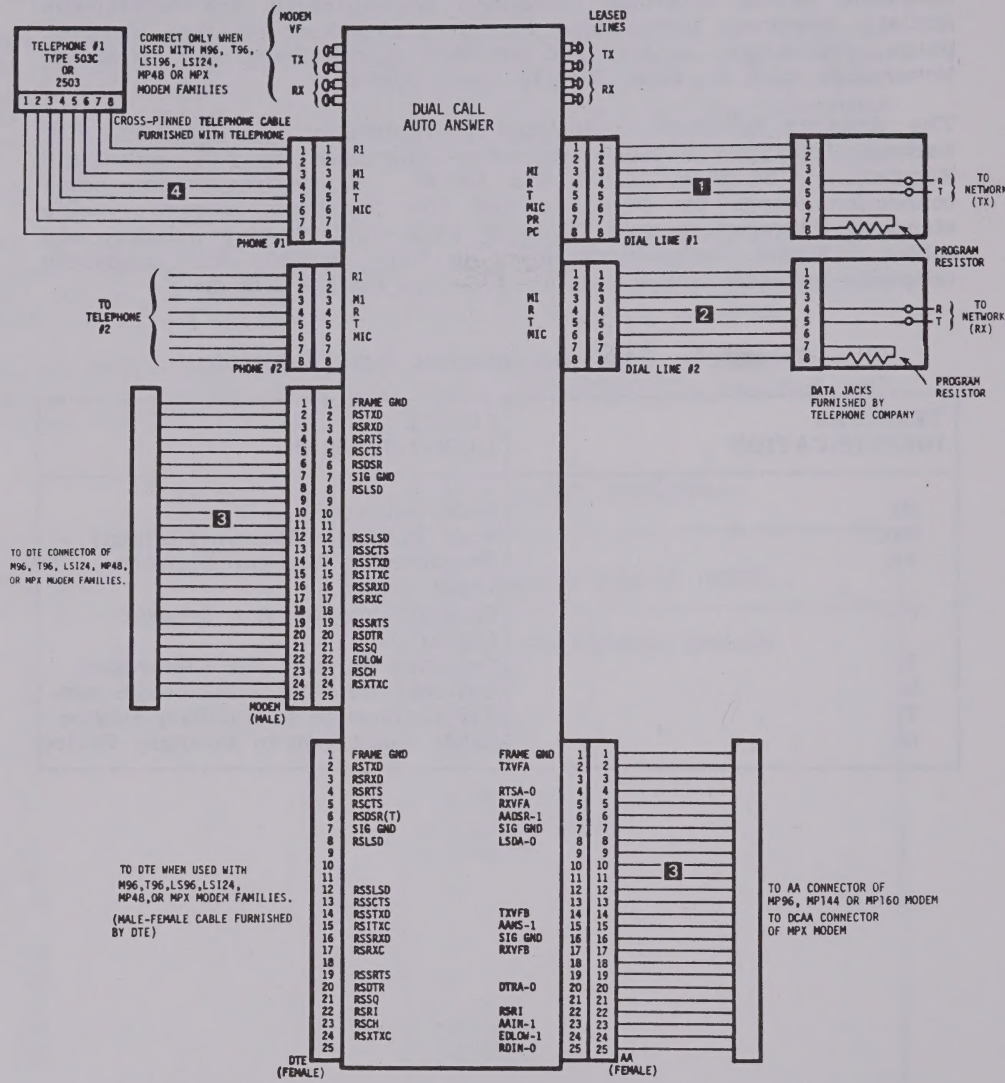
2.7 TELEPHONE INTERFACE DEFINITIONS

This manual describes only domestic telephone configurations. European telephone system interface connection configurations are functionally similar; however, terminology for the telephone interface devices, plugs, connectors, cables, and interface circuits may vary from the terminology used for their domestic counterparts.

The domestic telephone connection configurations are standard FCC National Telephone Network connections governed by FCC Rules and Regulations, Sections 68.104 and 68.502. These regulations cover connections made by Paradyne and the telephone company, using standard Universal Service Ordering Code (USOC) plugs, jacks, and cables. Signal designations used in this manual for describing telephone interface connections are listed in Table 2-7 below.

Table 2-7. Telephone Interface Signal Definitions

TERMINAL IDENTIFICATION	SIGNAL IDENTIFICATION
MI	Mode Indicator
MIC	Mode Indicator Common (Return)
PR	Programming Resistor Transmit Level Adjust
PC	Programming Resistor Common (Return)
T	Switched Network TIP Connection
R	Switched Network RING Connection
TI	TIP Connection to Ancillary Device
RI	RING Connection to Ancillary Device



CABLES:

1 DATA CABLE, KEYED-14 FEET 125-0021-1431 OR, 125-0025-0031 OR 125-0029-1431

2 DATA CABLE, KEYED-14 FEET 125-0021-1421 OR 125-0025-0031 OR 125-0029-1431

3 MALE FEMALE EIA CABLE 10-FEET 835-3564-1011

4 REPLACEMENT CROSS-PINNED CABLE, NONKEYED-8 FEET 125-0030-0831

482-249-03

Figure 2-5. Cable Interconnections

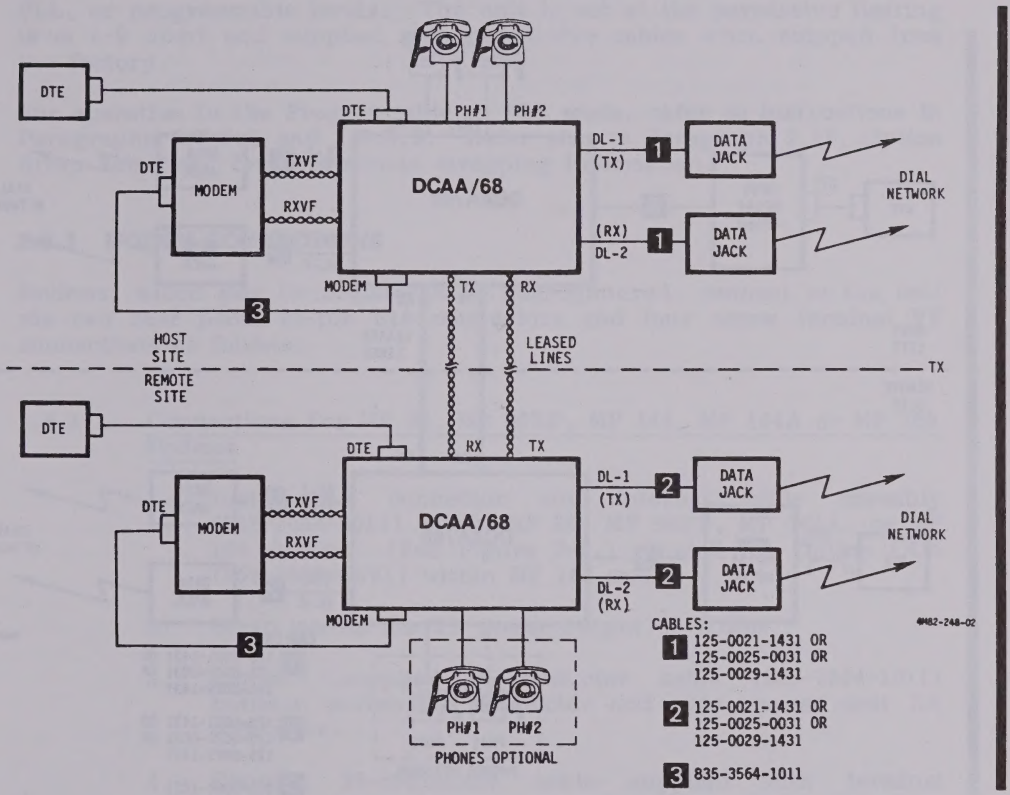


Figure 2-6. Typical System Connections

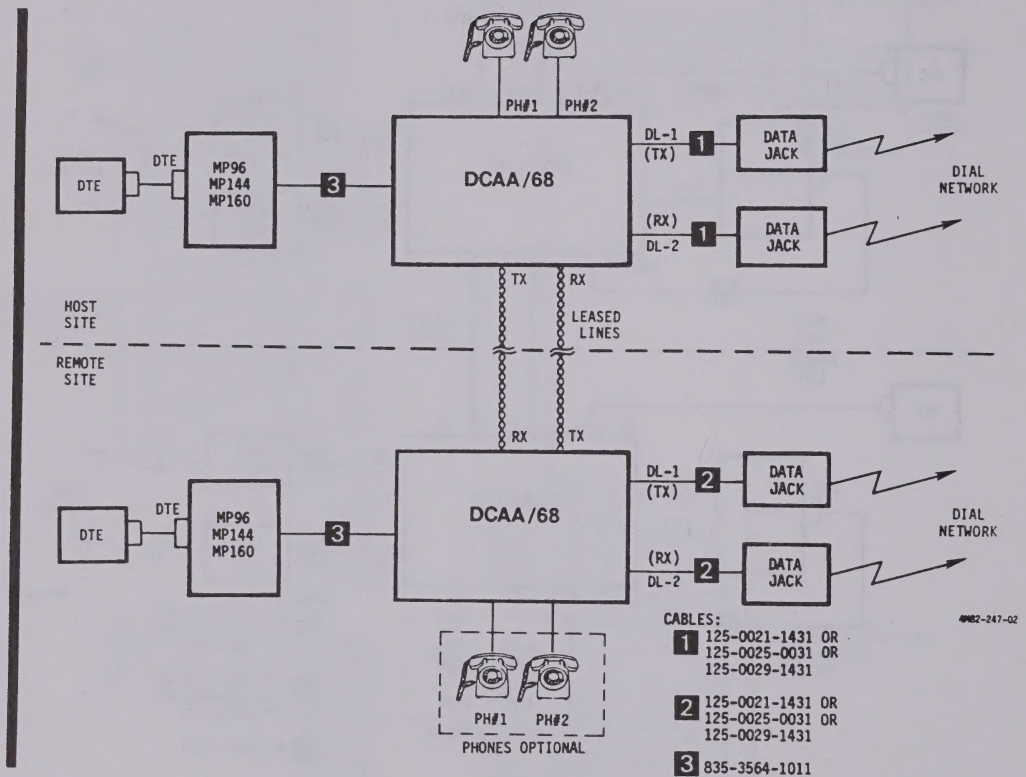


Figure 2-7. System Connections with MP 96, MP 144, and MP 160 Modems

2.8 NETWORK CONNECTIONS

The auto answer unit may be used with various types of central office lines, key telephone systems, or PBX lines that provide access to the switched telephone network. The data jacks to interface the unit with the network must be supplied by the telephone company. (See Paragraph 2.8.3.) The telephone sets used are plugged into jacks on the rear panel labeled PHONE #1 and PHONE #2.

Before installation, verify that the telephone line facilities meet the data transmission requirements for the specific data service to be used. The unit can be set to limit output transmit signal power at permissive, FLL, or programmable levels. The unit is set at the permissive limiting level (-9 dBm) and supplied with permissive cables when shipped from the factory.

For operation in the Programmable or FLL mode, refer to instructions in Paragraphs 2.8.3.2 and 2.8.3.3. Refer also to Paragraph 2.11, Option Strap Selection, for appropriate strapping information.

2.8.1 MODEM CONNECTIONS

Modems, which may be registered or nonregistered, connect to the unit via two rear panel 25-pin EIA connectors and four screw terminal VF connections as follows:

2.8.1.1 Connections For MP 96, MP 96RP, MP 144, MP 144A or MP 160 Modems

1. Install AA connector and internal cable assembly (819-3044-8011) within MP 96, MP 96RP, MP 144A, or MP 160 modem. (See Figure 2-8.) Install AA Option CCA (859-3419-5X61) within MP 144 modem.

2. Strap modem for TX power output of -1dBm.

3. Connect supplied 25-conductor cable (835-3564-1011) between modem AA connector and auto answer unit AA connector.

4. Connect 25-conductor cable supplied with terminal equipment from DTE to modem DTE connector.

NOTE

Do not connect modem TXVF and RXVF lines to the auto answer unit MODEM VF terminals. These signals are carried through the AA cable.

2.8.1.2 Connections For All Other Modems

1. Strap modem for TX power output of -1dBm.

2. Connect supplied 25-conductor cable (835-3564-1011) between modem DTE connector and the MODEM connector on the auto answer unit.

3. Connect modem TXVF and RXVF lines to the auto answer unit MODEM VF terminals with supplied VF cable (034-0012-0031). No polarity reference for the TX pair and the RX pair need be observed.

4. Connect 25-conductor cable supplied with terminal equipment from the DTE to the auto answer unit DTE connector.

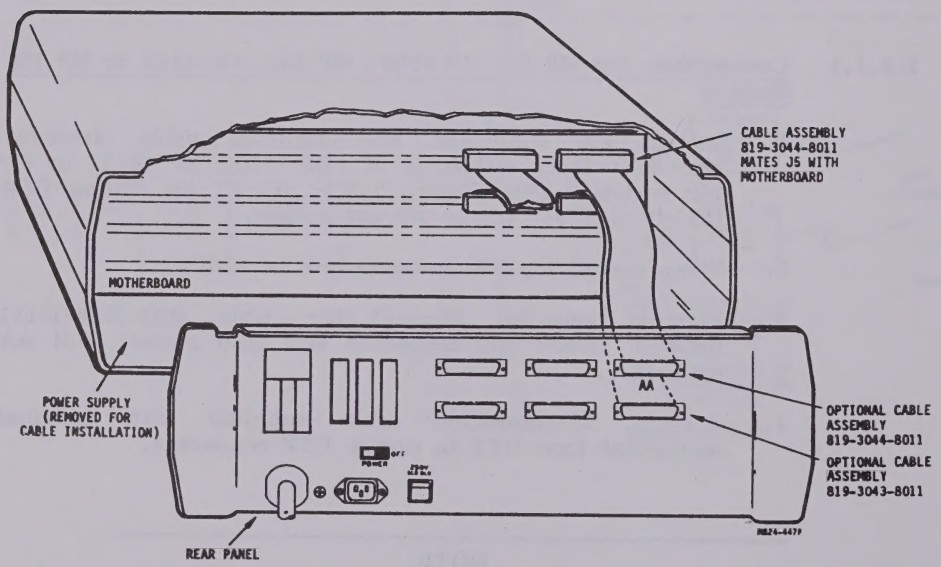


Figure 2-8. MP 96, MP 144A, and MP 160 Internal AA Cable Installation

APPENDIX B

DCAA FEATURE 2748-018

B.1 OVERVIEW

DCAA Feature 2748-018 is an option interface daughterboard and cable assembly (Figure B-1) that allows you to use your DCAA Model 4712 standalone unit with an MPX 4800 modem equipped with the ANALYSIS Diagnostic Computer (DMC) circuit card. The DMC circuit card must be equipped with the RD PROM set and communicate with the 44xx series or 5530 ANALYSIS Systems.

CAUTION

THE DMC CARD MUST HAVE FIRMWARE RELEASE 866-M089-0151 OR SUBSEQUENT RELEASE.

Once enabled, DCAA operation is controlled by the remote ANALYSIS console through the DMC circuitry. Primary means of communications for the MPX 4800 modem remains the 4-wire leased telephone lines; however, if a failure occurs in the leased lines, the ANALYSIS console operator can restore the link by dialing the two telephone numbers assigned to the DCAA at the failed site (one for the transmit pair and one for the receive pair).

Operation of the MPX 4800 modem is the same over the two dial lines as it is over the leased lines. The ANALYSIS system performs the same monitoring and diagnostic functions for the modem through the secondary channel that it did on the leased lines.

When the leased telephone lines are restored, the ANALYSIS console can command the DCAA to disconnect from the dial lines and switch the modem back to the leased lines.

B.2 INSTALLATION

Refer to the MPX 4800 Modem Installation and Operation Manual and the DMC Feature Supplement, or the new combined MPX Modem Series Installation and Operation Manual (Preface).

Take the following steps to install the DMC option interface daughterboard onto the DMC circuit card (Figure B-1).

1. Remove the front and rear bezels from the modem and lift off the top cover. Remove the MUX card (if installed) and the DMC card from the case.

2. Remove the filler panel from the rear panel of the DMC circuit card. (The holes freed in the DMC card become the mounting holes for the option interface daughterboard.)

CAUTION

WIRE STRAPS A AND B ON THE DMC OPTION INTERFACE DAUGHTERBOARD ARE FOR FACTORY TEST PURPOSES ONLY AND MUST REMAIN INSTALLED.

3. Install the DMC option interface daughterboard (866-7796-8xxx) solder side up onto the DMC circuit card so that the 28-pin connector J1 (female) mates with the 28 pins of J2 on the DMC card (Figure B-2).

   The threaded tips of the metal standoffs extend through the mounting holes in the DMC card. Hold the daughterboard in place and turn the DMC card over (solder side up). Place the self-locking nuts onto the standoff tips and tighten.

4. Reassemble the DMC and MUX (if used) cards in the modem; replace the top cover and bezels.

5. Connect the 26-conductor cable (819-3045-0111), fitted with a 26-pin socket on one end and a 25-pin plug on the other end, from the DMC 26-pin male connector DCAA/HOT STANDBY (actually J2 of the interface daughterboard) to the 25-pin female AA connector on the rear panel of the DCAA Model 4712 standalone unit (Figure B-3).

6. Connect the MPX Modem leased line VF cable to the DCAA LEASED LINE TX and RX terminals with the short modular plug to spade lug adapter supplied with the modem (cable kit, 866-5515-0011). Connect the RED and GREEN wires to the TX terminals, and the YELLOW and BLACK wires to the RX terminals. Strap the MPX 4800 Modem in accordance with the instructions in the modem manual and DMC supplement.

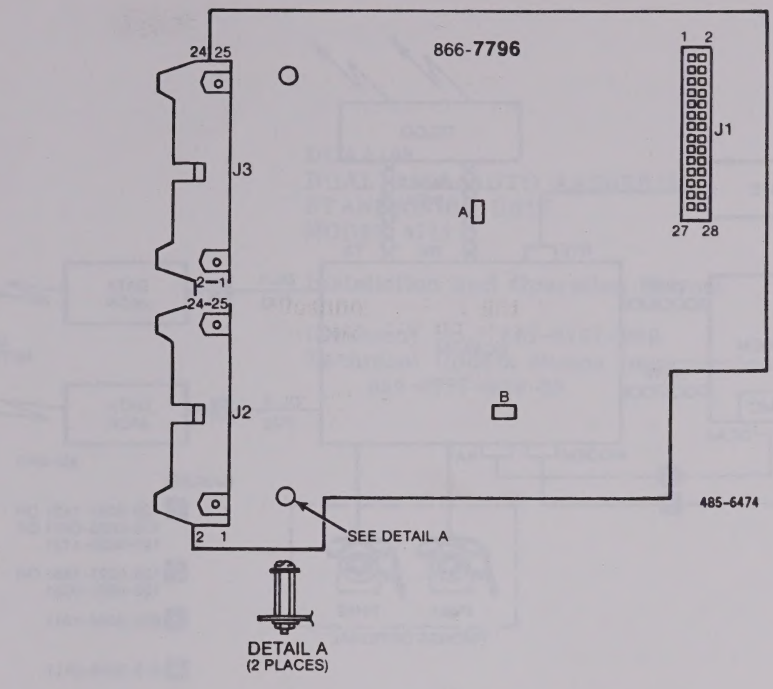


Figure B-1. DCAA Option Interface Daughterboard

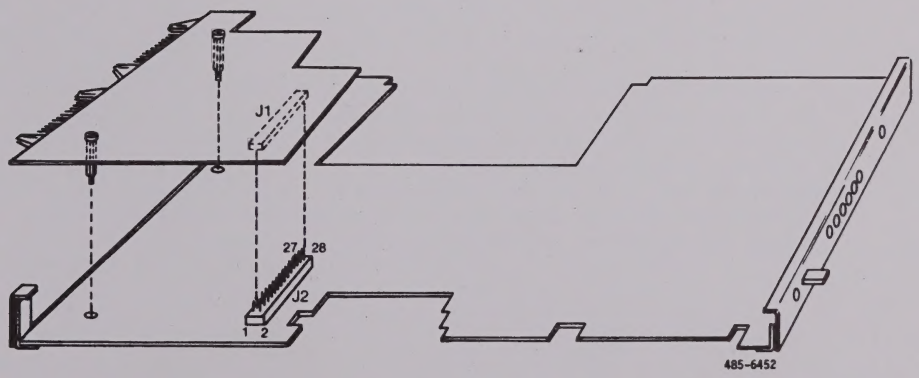


Figure B-2. DCAA Option Interface Daughterboard Installation

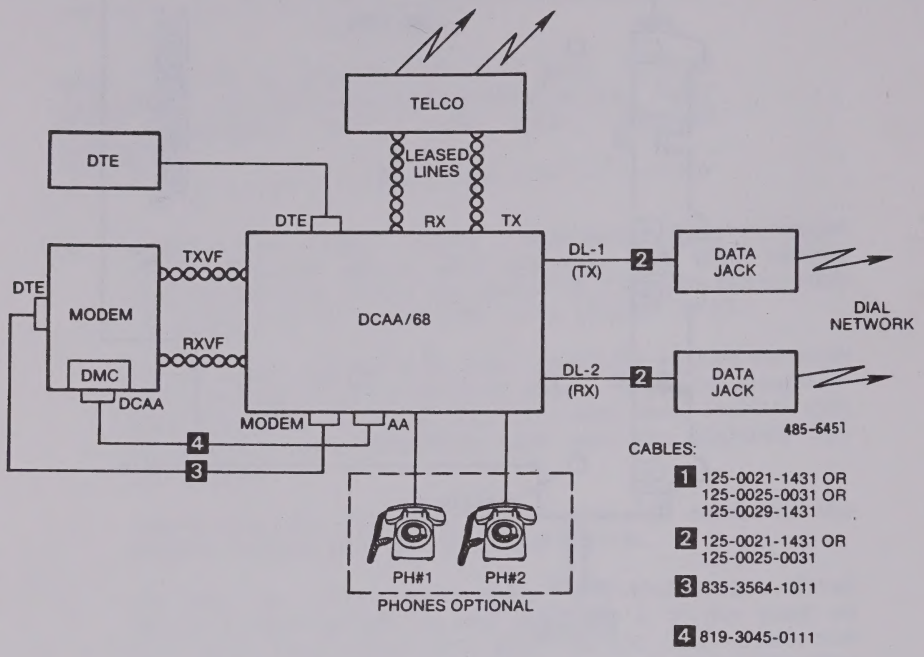


Figure B-3. DCAA/MPX 4800 Cabling

DCAA/68
DUAL CALL AUTO ANSWER/68
STANDALONE UNIT
MODEL 4712

Installation and Operation Manual

Document No. 862-6757-M20
Technical Update Memos Incorporated:
862-6757-M20-00

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2nd Edition (October 1983)

This edition of the Dual Call Auto Answer/68 Standalone Unit, Model 4712, Installation and Operation Manual, Document Number (862-6757-M20) contains information available at the time of publication. This document supersedes in its entirety the preliminary edition dated November 1982.

Changes are continually made to the specifications herein; before using this publication in connection with the operation of Paradyne systems, consult the latest Paradyne Publication Bibliography for the editions that are applicable and current.

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PREFACE

This manual contains installation, operation, and maintenance information for the FCC Part 68 approved Dual Call Auto Answer (DCAA/68) Standalone Unit, Model 4712. This manual is an installer's guide, operator's guide, and limited maintenance guide for the DCAA/68 Standalone Unit. It is also the field service installation, operation, and maintenance training guide.

BASIC MANUAL

This manual contains three chapters organized as follows:

Chapter 1	Introduction	General Information and Equipment Specifications
Chapter 2	Installation	Installation Planning, Prerequisites, and Instructions
Chapter 3	Operation	Operating Instructions and System Checkout

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Figure 1-1. Dual Call Auto Answer (DCAA/68)
Standalone Unit, Model 4712

CHAPTER 1

INTRODUCTION

1.1 GENERAL

The Dual Call Auto Answer (DCAA/68) Model 4712, shown in Figure 1-1, is a standalone unit, containing an internal dc power supply, designed to connect data communications equipment (DCE) to the switched telephone network. It operates with four-wire, full-duplex modems and provides point-to-point or multipoint connected modems with dial network backup in the event of loss or degradation of their leased lines. The unit operates in four-wire full-duplex applications over two dial lines, but does not operate in two-wire, half-duplex over one dial line. Figure 1-2 is a typical system configuration. In addition, the unit provides these features:

- Internal Data Access Arrangement (DAA).
- Isolation of nonregistered customer equipment from the telephone network to protect the network and personnel from hazardous voltages and protection of customer equipment from surges occurring on the telephone network.
- Detection of incoming ringing signals to permit a unit to operate in an unattended automatic answering mode.
- Switching of transmission paths between dedicated and dial-backup lines.
- A two-second delay in giving the data equipment access to the telephone lines to permit proper operation of telephone company automatic billing equipment.

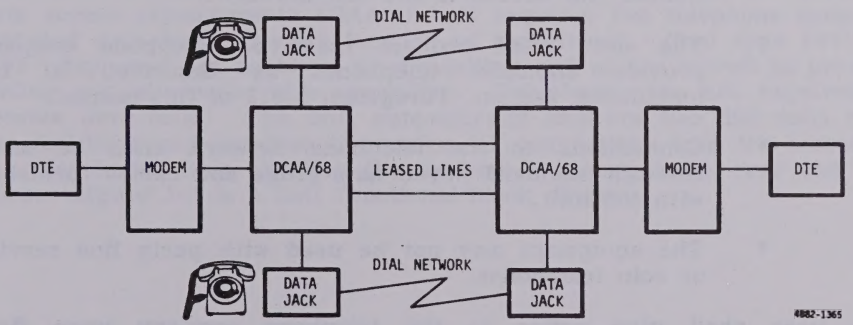


Figure 1-2. Typical System Configuration

- Automatic limiting of transmission signal power.
- Manual attenuator providing 0 to 15 db loss in the dial transmit power.
- Program attenuator control providing 0 to 12 db loss in the dial transmit power when programmed data jacks are used.
- Automatic disconnect after 15 seconds of silence in data transmission.
- L.E.D. monitoring of the status of significant signals in the calling and answering sequence.
- Programmable, Permissive, or FLL modes of operation.

1.2 NOTICE TO USERS

The unit meets the registration requirements of the Federal Communications Commission (FCC) Rules and Regulations, Volume X, Part 68. It has been granted registration number AW292J-70304-DP-E. The ringer equivalence is 0.3B.

The FCC has established rules which govern the direct connection of data couplers to the telephone network. Before connecting the unit to the network, the user must comply with the following rules:

- The telephone company shall be notified of each line to which connections are to be made and shall be provided with the above registration number and ringer equivalence. This registration number and ringer equivalence are also shown on a label on the equipment.
- The user shall request that the telephone company provide the appropriate USOC data jacks, as described in the installation section, Paragraph 2.8.3 of this manual, for access to the dial network.
- The user shall request that the telephone company provide standard telephones as described in the installation section, Paragraph 2.8.2 of this manual.
- Connections to the telephone network shall be made through standard keyed data plugs and cables furnished with the unit.
- The equipment may not be used with party line service or coin telephones.

The user shall give notice to the telephone company upon final disconnection of the equipment from the network lines.

Should the unit or terminal equipment malfunction while connected to the telephone network, the unit should be disconnected until the source of the problem can be determined and repairs made. If this is not done, the telephone company may notify the user that temporary discontinuance of service is required. Where prior notice is not practical, the telephone company may temporarily discontinue service forthwith, if such action is reasonable under the circumstances. In such case, the telephone company shall (1) promptly notify the user of such temporary discontinuance, (2) afford the user the opportunity to correct the situation which gave rise to the discontinuance, and (3) inform the user of his right to bring a complaint to the FCC pursuant to the procedures set forth in the Rules and Regulations, Part 68, Subpart E.

The telephone company may make changes in its communications facilities, equipment, operations, or procedures where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any user's terminal equipment incompatible with the telephone company communications facilities, or to require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the user shall be given adequate notice, in writing, to allow the user an opportunity to maintain uninterrupted service.

Repair of the unit shall be accomplished only by the manufacturer or his authorized agent; however, preventive maintenance may be performed by a user in accordance with this manual. It is the responsibility of users requiring service to report the need for service to Paradyne Corporation or to one of its authorized agents. Unauthorized repair by the user could result in noncompliance with the FCC Rules and Regulations, Part 68, Subpart D.

1.3 FUNCTIONAL DESCRIPTION

The Auto Answer Unit provides two-call dial-backup for all Paradyne modems, including the MP, LSI, T, M, and SP series of modems. It interfaces directly with the dial network without the need for separate data access arrangements (DAA's). It requires two telephone company installed data jacks at each location of the circuit. Two type 503C or 2503 telephones are required at the calling end of the circuit to provide dialing and alternate voice capability. Telephones are not required to receive data calls. The unit automatically answers two dial calls over two dial lines and switches the modem VF connections from the leased to the dial lines, thus allowing the modems to communicate over the dial lines. Figure 1-3 is a unit functional block diagram.

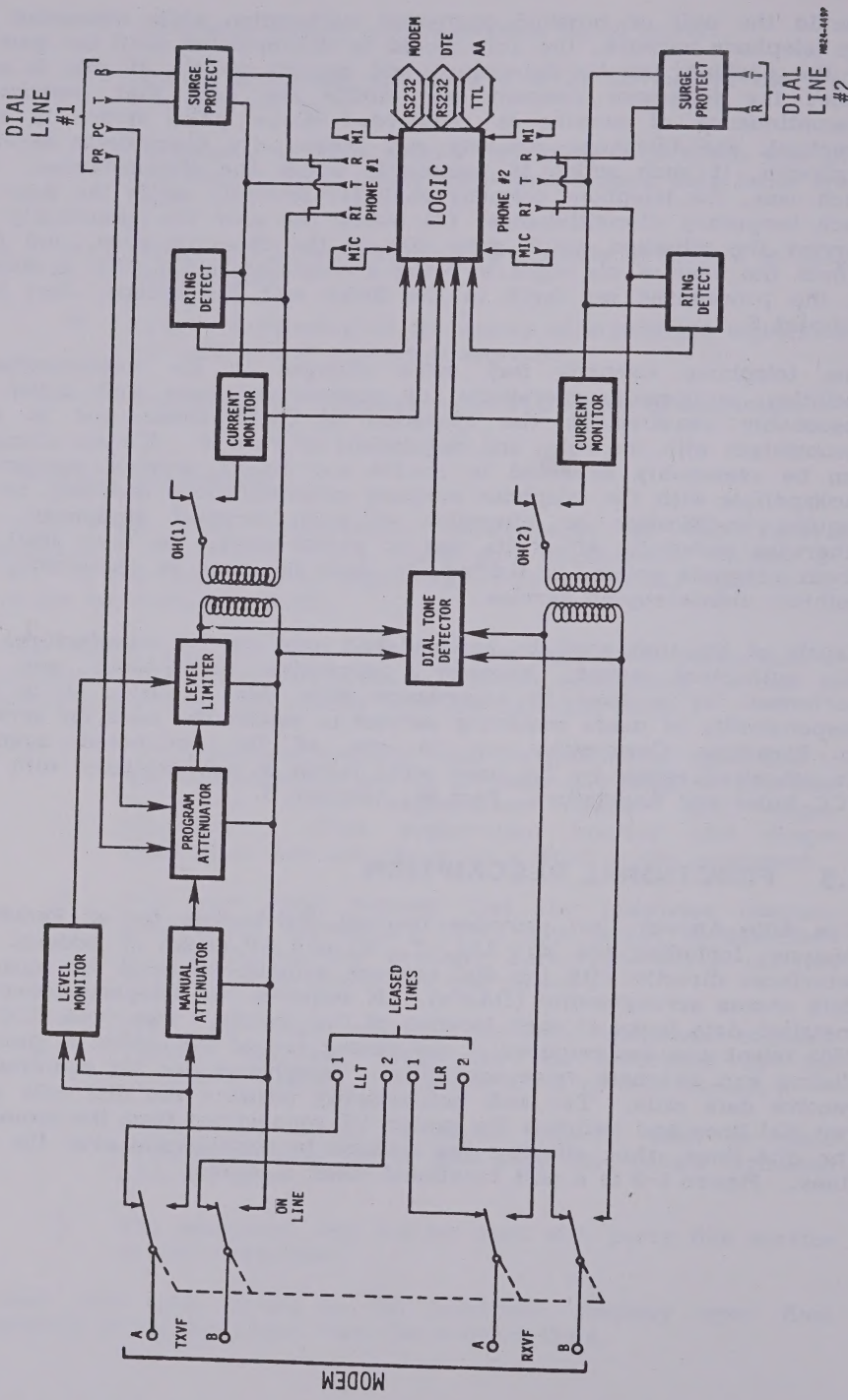


Figure 1-3. Functional Block Diagram

1.4 PHYSICAL DESCRIPTION

The auto answer unit is packaged in a free-standing industrial foam plastic case with a removable top cover for easy access to the electronic circuits. The electronic circuitry is contained on a single 14-inch by 16-inch circuit card assembly with integral power supply. The unit is 17 inches (43.18 cm) wide, 3-6 inches (9.14 cm) high, 16.5 inches (41.91 cm) deep, and weighs 8.5 pounds (3.68 kg).

The front panel contains one pushbutton switch, one toggle switch, and twelve LED indicators described in Chapter 3, Operation.

The lower half of the rear panel assembly contains one ac line receptacle, one fuse/fuse holder, three 25-pin EIA-type connectors (one male and two female), and two 8-position telephone-type modular data jacks. The upper half of the rear panel contains two 8-position modular data jacks and two screw-type phone line terminal boards, containing four screw terminals each.

1.5 TECHNICAL SPECIFICATIONS

CONFIGURATION:
DCAA/68 Standalone Unit.

COMPATIBILITY:
Compatible with Paradyne MP, LSI, T, M, and SP series of modems.

APPLICATIONS:
4-wire dial back-up.

NETWORK CONNECTIONS:
Programmable
Permissive
FLL

DIGITAL INTERFACE:
EIA RS232C
TTL

TELEPHONE LINE INTERFACE:
Two 8-position modular data jacks for connections to the telephone network via telephone company-supplied data jacks.

TELEPHONE CONNECTIONS:
Two 8-position modular data jacks for connections to two type 503 telephone sets.

REGISTRATION/APPROVALS:
UL approved.
FCC Part 68 approved.
FCC Part 15 certification not required.

POWER REQUIREMENTS:

Voltage:
105 to 125 Vac, .105 amps.
Frequency:
47 to 63 Hz.
Power Consumption:
10 Watts.

ENVIRONMENTAL REQUIREMENTS:

Operating temperature:
0° to +50°C.
Relative Humidity:
5% to 95% (noncondensing).

PHYSICAL CHARACTERISTICS:

Width:
17 inches (43.18 cm).
Height:
3.6 inches (9.14 cm).
Depth:
16.5 inches (41.91 cm).
Weight:
8.5 pounds (3.68 Kgms).

1.6 EQUIPMENT SUPPLIED

The following list is a complement of equipment supplied. However, this list does not necessarily reflect the current revision level of the unit or any subassemblies supplied with the basic unit. Specific revisions that affect form, fit, or function are appropriately referenced within the manual.

Dual Call Auto Answer Unit/FCC Part 68 approved
Model No. 4712-01

DCAA/68 Standalone Unit Assembly	862-6757-0x11
Auto Answer Circuit Card Assembly/Power Supply	862-6760-5x61
• Fuse, 1/4 amp., 250V Slo-Blo	190-0006-0031
Cable Assembly, RS232, M-F, 10 feet	835-3564-1011
Cable Assembly, Programmable Mode • Standard 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (2 each)	125-0021-1431

1.7 EQUIPMENT OPTIONS

MP 144 Option Feature	
• DCAA/68 Standalone Unit	862-6757-0x11
• AA Option CCA (DTE Adapter #3)	859-3419-5x61
MP 96/MP 96 RP/MP 144A/MP 160 Option Feature	
• DCAA/68 Standalone Unit Assembly	862-6757-0x11
• Cable Assembly, Line (installed within modem assembly)	819-3044-8011
M 96/MP 48/LSI 24/LSI 96/T 96/MPX Option Feature	
• DCAA/68 Standalone Unit Assembly	862-6757-0x11
• Cable, VF, Modem to DCAA/68	034-0012-0031
Cable Assembly, (Permissive Mode) Standard 4-conductor telephone cable with miniature keyed 6-pin plugs on each end, 14 feet (2 each)	125-0025-0031
Cable Assembly, FLL Mode	
• Special 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (1 each)	125-0029-1431
• Standard 8-conductor data cable with miniature keyed 8-pin plugs on each end, 14 feet (1 each)	125-0021-1431
Rack Mount Option	862-4680-0011

1.8 EQUIPMENT ACCESSORIES

Telephone voice cable (replacement)	125-0030-0831

1.9 EQUIPMENT REQUIRED BUT NOT SUPPLIED

Telephones (2 each), Type 503C (dial) or 2503 (touch tone) with cables and these optional features:

Option A2--Data Set Controls Line
Option D8--Voice Mode Indication

CHAPTER 2
INSTALLATION

2.1 GENERAL

Installation requirements depend on the hardware/strap options being utilized and on the specific application or intended use. This chapter contains information to satisfy both mechanical and electrical installation requirements. After completing installation, perform a system checkout to ensure proper unit and system operation.

2.2 INSTALLATION PLANNING

The unit should be installed within seven feet of a grounded ac outlet capable of furnishing 105-125 volts ac, 47-63 Hz, 0.105 amps. The unit must be installed within the range of the interface cables to the modem and the DTE; RS232C specifications require that these cables not exceed 50 feet. The unit is not position sensitive; however, the front panel is configured for eye level, horizontal viewing. The installation location should also provide for convenient access to network data jacks and for simultaneous operation of telephones and viewing of front panel indicators.

The installation area should be clean, well-lighted, and free from environmental extremes. Since the unit has no forced air cooling, installation should permit unobstructed air flow for ventilation. Allow two to three feet for front and rear access to the unit during installation and maintenance. A minimum of three inches is required at the rear of the unit for cable clearance and air flow. Figure 2-1 illustrates unit dimensions and installation requirements.

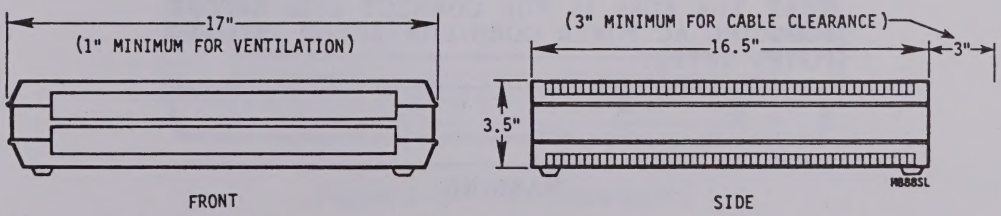


Figure 2-1. Dimensional Drawing and Installation Requirements

2.3 UNPACKING AND INSPECTION

Before unpacking the unit, inspect the packing container for unusual damage, i.e., large gouges, holes, collapsed corners, etc. Then unpack and thoroughly check the unit for external damage, such as dents or scratches and broken controls, indicators, or connectors. If physical damage is present, retain the packaging material and contact the carrier immediately. Each unit has been thoroughly inspected, both mechanically and electrically, before shipping.

2.4 MECHANICAL INSTALLATION

The unit is packaged in a freestanding case with ventilating slots on both sides. It contains no forced air cooling; therefore, it should be placed in a relatively well-ventilated environment. Rubber feet on the bottom raise the unit approximately 1/2 inch from its resting surface for air circulation beneath the unit. Figure 2-1 shows the recommended clearances for shelf or tabletop installation. Provide clearance for interconnection cables and their plugs. Do not sharply bend, crimp, or smash connecting cables/connectors. The data terminal equipment cables are part of each respective terminal and vary with the type terminal utilized.

2.5 ELECTRICAL INSTALLATION

The input ac power required is 105-125 Vac, 47-63 Hz, as specified on the identification plate affixed to the rear panel. The fuse used is a 1/4 amp, 250V Slo Blo, 3 AG. Connect the unit to the ac power source via the supplied seven-foot power cord. Signal ground can be strapped to chassis ground on the circuit board if required by system configuration and/or local electrical codes. This is done by installing a 0 ohm resistor as shown in Figure 2-2.

WARNING

THE UNIT IS POWERED ON WHEN POWER CORD IS PLUGGED INTO AC POWER SOURCE. BE CERTAIN THAT THE FUSE IS THE CORRECT SIZE BEFORE PLUGGING AC POWER CORD/CONNECTOR INTO AC POWER OUTLET.

WARNING

DANGEROUS VOLTAGES ARE PRESENT NEAR REAR OF CIRCUIT CARD ASSEMBLY WHEN TOP COVER IS REMOVED AND POWER IS ON.

2.5.1 UNIT DISASSEMBLY

To remove top cover for access to circuit card components and strap selections, perform the following steps: (See Figure 2-2.)

1. Remove three screws along top right-hand side of unit (as viewed from front).

2. Remove three screws along bottom left-hand side of unit.

3. Lift top from unit and set aside.

4. Strapping selections can be changed with top cover removed.

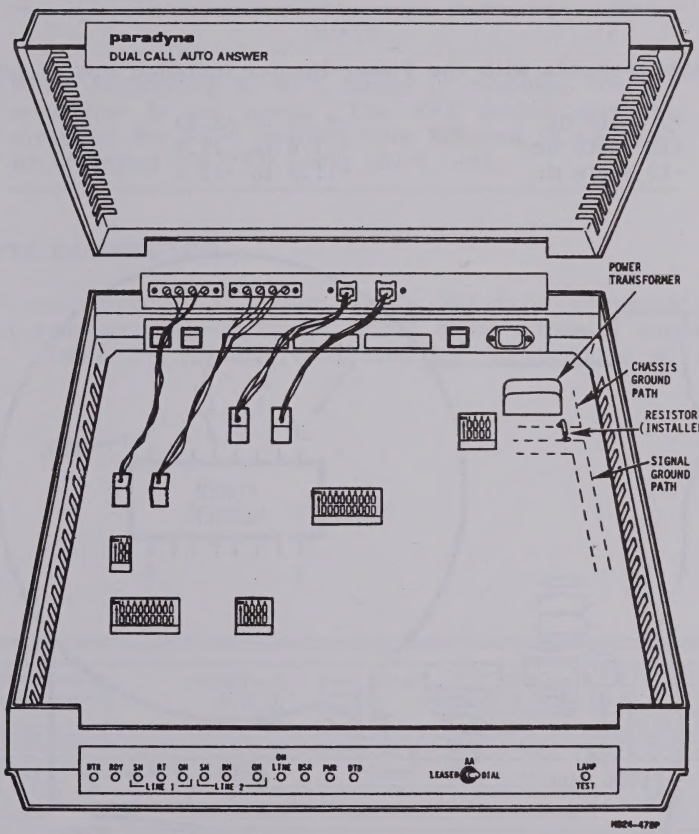


Figure 2-2. Unit Disassembly

To remove upper rear panel, locate four cables from rear panel to circuit card assembly. Remove cables by unplugging from circuit card. Note cable routing and orientation on circuit card. Remove two mounting screws through the spacer sleeves on each end of panel. Upper rear panel is now free and can be moved away.

To replace upper rear panel and top cover, reverse above procedure.

2.5.2 VOLTAGE ADJUSTMENTS

The +5 volt dc voltage level is the only adjustment that can be accomplished by field maintenance personnel. This adjustment is made at potentiometer A1R8. Measure the voltage at the circuit card Power Header at the point illustrated in Figure 2-3 to determine if adjustment of the +5 volt supply is necessary.

CAUTION

VOLTAGE ADJUSTMENTS SHOULD BE PERFORMED WITH THE POWER HEADER REMOVED TO PREVENT ACCIDENTAL CIRCUIT DAMAGE.

Voltage measurements with the Power Header installed are as follows:

+5 volts dc	+4.75 to +5.25
+12 volts dc	+11.4 to +12.6
-12 volts dc	-11.4 to -12.6

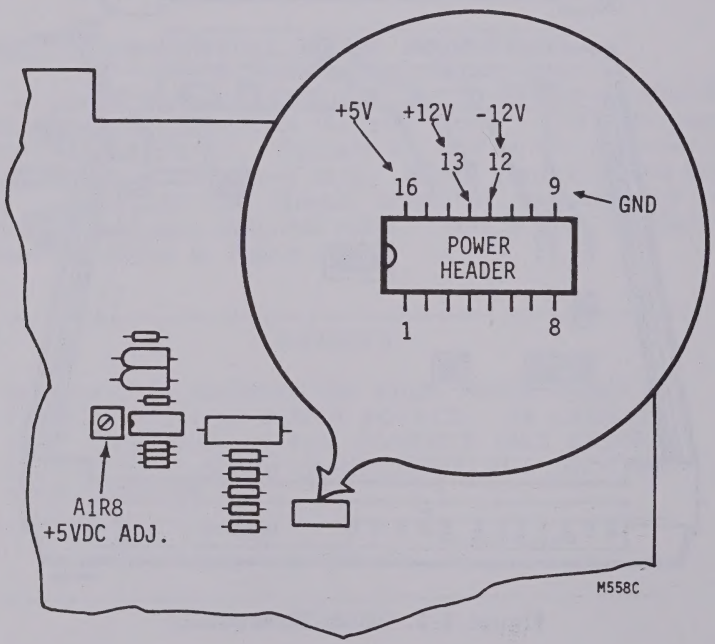


Figure 2-3. Power Supply Voltage Test Points

Because the power supply is an integral part of the circuit card assembly, it cannot be individually replaced if faulty. Out-of-tolerance voltages require replacement of the complete circuit card assembly to ensure correct circuit operation.

2.6 EQUIPMENT INTERFACE CONNECTIONS

Interface connections to the data terminal equipment, modem, and phone lines vary with the configuration used. See Figure 2-4 for the location of the various interface connectors, Figure 2-5 for unit interconnection details, and Figures 2-6 and 2-7 for system configurations/connections.

The DTE connector and the MODEM connector described in the following paragraph are used to interconnect the unit with the DTE and the modem. These two connectors (DTE and MODEM) are used with all modems except the MP 96, MP 96 RP, MP 144, and MP 160. These latter modem types are interconnected to the auto answer unit through the AA connector.

NOTE

When connecting to MPX family of modems, the AA connector is not used. The MPX modem must be strapped for SW-0 enabled (Pin 22) and DCAA must be strapped for TTL Level (S7-3, -4).

2.6.1 DTE CONNECTOR

The DTE connector is a 25-pin female EIA-type connector, and it requires a standard male-to-female RS232 cable normally supplied with the DTE. Table 2-1 defines the interface connections at the DTE connector.

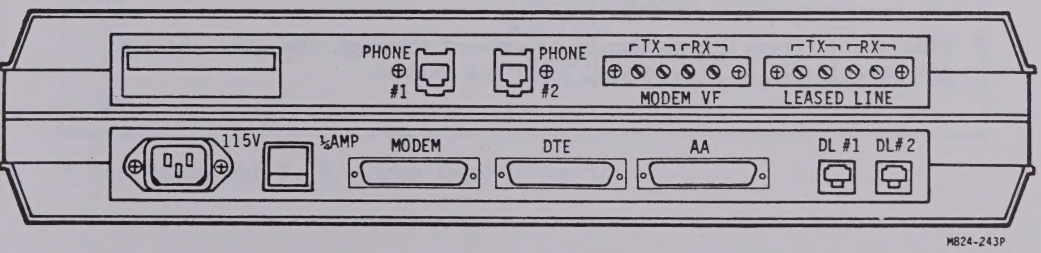


Figure 2-4. Rear Panel

Table 2-1. DTE Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground (FG)
2	Transmit Data (TXD)
3	Received Data (RXD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	*Data Set Ready (DSR)
7	Signal Ground (SG)
8	Line Signal Detect (LSD)
9	-
10	-
11	-
12	Sec. Line Sig. Detect (SLSD)
13	Sec. Clear To Send (SCTS)
14	Sec. Transmit Data (STXD)
15	Internal Transmit Clock (ITXC)
16	Sec. Received Data (SRXD)
17	Receiver Clock (RXC)
18	-
19	Sec. Request To Send (SRTS)
20	Data Terminal Ready (DTR)
21	Signal Quality (SQ)
22	Ring Indicator (RI)
23	Data Rate Select (CH)
24	External Transmitter (XTXC)
25	-

* This signal from the modem is processed through the auto answer unit and is not a True signal from the modem.

2.6.2 MODEM CONNECTOR

The MODEM connector is a 25-pin EIA-type connector which requires a standard male-to-female RS232 cable for connection to the modem DTE connector. This 10-foot cable, Paradyne part number 835-3564-1011, is supplied with the auto answer unit. Table 2-2 defines the interface definitions at the MODEM connector.

Table 2-2. MODEM Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground (FG)
2	Transmit Data (TXD)
3	Received Data (RXD)
4	Request To Send (RTS)
5	Clear To Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground (SG)
8	Line Signal Detect (LSD)
9	-
10	-
11	-
12	Sec. Line Sig. Detect (SLSD)
13	Sec. Clear To Send (SCTS)
14	Sec. Transmit Data (STXD)
15	Internal Transmit Clock (ITXC)
16	Sec. Received Data (SRXD)
17	Receiver Clock (RXC)
18	-
19	Sec. Request To Send (SRTS)
20	Data Terminal Ready (DTR)
21	Signal Quality (SQ)
22	*EDLOW
23	Data Rate Select (CH)
24	External Transmitter Clock (XTXC)
25	-

* See Paragraph 2.12, Strap Description 16.

2.6.3 AA CONNECTOR

This connector is used for interconnection to an MP 96, MP 96RP, MP 144, or MP 160 modem. It carries all auto answer/modem digital control signals and the TXVF and RXVF analog signals between the auto answer unit and the modem. For the above modems, this is the only connection made for digital and VF signals to and from the modem. Additionally, all digital signals through this connector are TTL levels except RSRI (Pin 22) which is RS-232 level.

The AA connector is a 25-pin female EIA-type connector, requiring a supplied standard male-to-female, 10-foot RS232 type cable, Paradyne part number 835-3564-1011, for connection to the modem AA connector. Table 2-3 defines the interface connections at the AA connector.

Table 2-3. AA Connector Interface Definitions

CONN. PIN NO.	PARADYNE SIGNAL DESIG.
1	Protective (Frame) Ground
2	TXVFA
3	-
4	RTSA-0
5	RXVFA
6	AADSR-1
7	Signal Ground
8	LSDA-0
9	-
10	-
11	-
12	-
13	-
14	TXVFB
15	AANS-1
16	Signal Ground
17	RXVFB
18	-
19	-
20	DTRA-0
21	-
22	RSRI
23	AAIN-1
24	EDLOW-1
25	RDIN-0

2.6.4 DL #1 AND DL #2 (TELCO NETWORK) CONNECTORS

These two 8-position keyed modular data jacks connect the unit to the dial telephone network. DL #1 connects the TX circuit to the dial line; DL #2, the RX circuit. A choice of cables is available for connecting DL #1 and DL #2 to the telephone company-installed data jacks for either the permissive, programmable, or fixed loss loop (FLL) mode of operation. Appendix A schematically defines these cables. These three operational modes are discussed in detail in Paragraph 2.8.3. The two cables used for the permissive mode are standard and supplied with each unit. Tables 2-4 and 2-5 define the interface connections at the DL #1 and DL #2 jacks.

Table 2-4. DL #1 (TX Line) Connecter Interface Definitions

CONN. PIN NO.	SIGNAL DESIG.
1	No Connection
2	No Connection
3	MI
4	R
5	T
6	MIC
7	PR
8	PC

Table 2-5. DL #2 (RX Line) Connector Interface Definitions

CONN. PIN NO.	SIGNAL DESIG.
1	No Connection
2	No Connection
3	MI
4	R
5	T
6	MIC
7	No Connection
8	No Connection

2.6.5 PHONE #1 AND PHONE #2 (TELEPHONE INTERFACE) CONNECTORS

These two 8-position nonkeyed modular data jacks connect the unit to two type 503 or type 2503 telephones. These telephones are required only at the calling end and are optional at the receiving end. Eight-conductor telephone cables with 8-position nonkeyed plugs are normally supplied with the telephones. Spare or replacement cables are available from Paradyne as part number 125-0030-0831. Table 2-6 defines the interface connections at the phone #1 and phone #2 jacks.

NOTE

If other than telephone company supplied cables (or the Paradyne replacement) are used, the cable wiring must be transposed such that pin 1 on one end connects to pin 8 on the other, pin 2 to pin 7, pin 3 to pin 6, etc.

Table 2-6. Phone #1 and Phone #2 Connector Interface Definitions

CONN. PIN NO.	SIGNAL DESIG.
1	RI
2	No Connection
3	MI
4	R
5	T
6	MIC
7	No Connection
8	No Connection

2.6.6 LEASED LINE TERMINAL STRIP

Four screw-type terminals on this strip connect to the leased line circuits. Two terminals are marked TX (for the transmit pair), and two are marked RX (for the receive pair). The pairs have no polarity reference.

2.6.7 MODEM VF TERMINAL STRIP

Four screw-type terminals, two marked TX and two marked RX, on this strip connect to the modem TXVF and RXVF pairs. These connections are made for all modems except the MP 96, MP 96RP, MP 144, and MP 160. For these latter modems, TXVF and RXVF connections are made through the AA connector.

2.7 TELEPHONE INTERFACE DEFINITIONS

This manual describes only domestic telephone configurations. European telephone system interface connection configurations are functionally similar; however, terminology for the telephone interface devices, plugs, connectors, cables, and interface circuits may vary from the terminology used for their domestic counterparts.

The domestic telephone connection configurations are standard FCC National Telephone Network connections governed by FCC Rules and Regulations, Sections 68.104 and 68.502. These regulations cover connections made by Paradyne and the telephone company, using standard Universal Service Ordering Code (USOC) plugs, jacks, and cables. Signal designations used in this manual for describing telephone interface connections are listed in Table 2-7 below.

Table 2-7. Telephone Interface Signal Definitions

TERMINAL IDENTIFICATION	SIGNAL IDENTIFICATION
MI	Mode Indicator
MIC	Mode Indicator Common (Return)
PR	Programming Resistor Transmit Level Adjust
PC	Programming Resistor Common (Return)
T	Switched Network TIP Connection
R	Switched Network RING Connection
TI	TIP Connection to Ancillary Device
RI	RING Connection to Ancillary Device

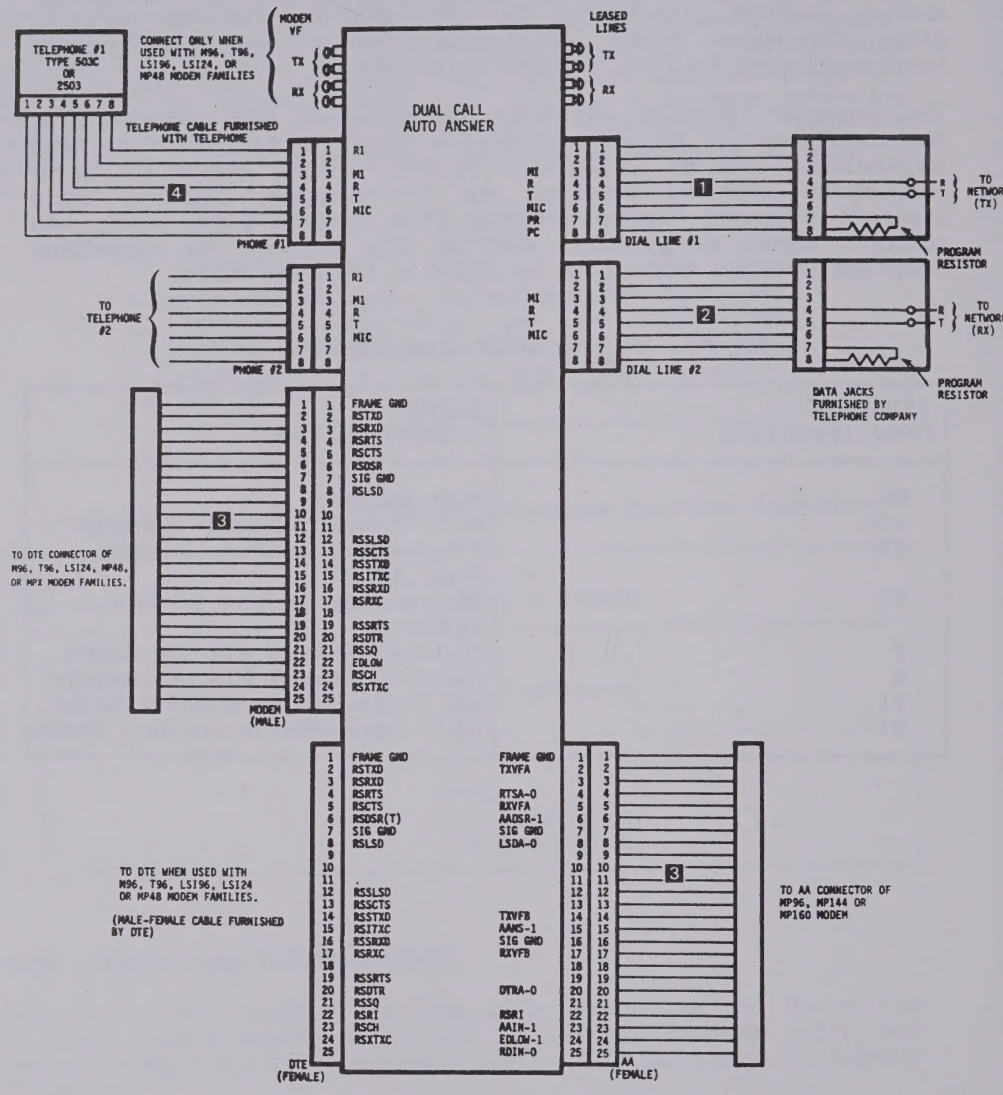


Figure 2-5. Cable Interconnections

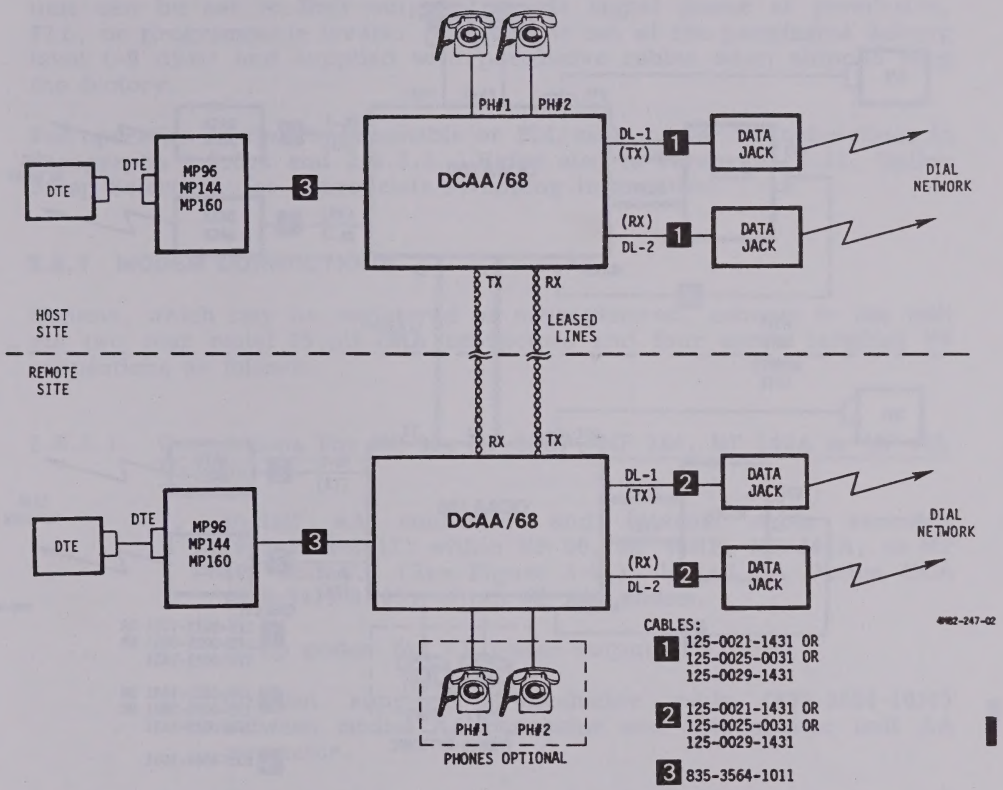


Figure 2-6. Typical System Connections

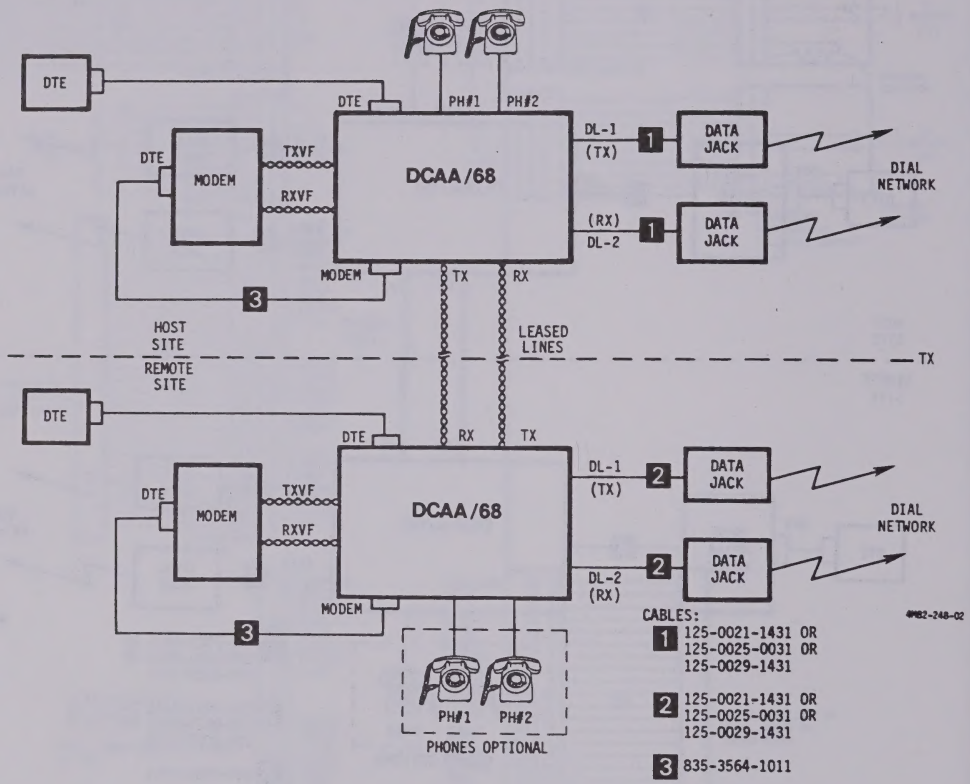


Figure 2-7. System Connections with MP 96, MP 144, and MP 160 Modems

2.8 NETWORK CONNECTIONS

The auto answer unit may be used with various types of central office lines, key telephone systems, or PBX lines that provide access to the switched telephone network. The data jacks to interface the unit with the network must be supplied by the telephone company. (See Paragraph 2.8.3.) The telephone sets used are plugged into jacks on the rear panel labeled PHONE #1 and PHONE #2.

Before installation, verify that the telephone line facilities meet the data transmission requirements for the specific data service to be used. The unit can be set to limit output transmit signal power at permissive, FLL, or programmable levels. The unit is set at the permissive limiting level (-9 dBm) and supplied with permissive cables when shipped from the factory.

For operation in the Programmable or FLL mode, refer to instructions in Paragraphs 2.8.3.2 and 2.8.3.3. Refer also to Paragraph 2.11, Option Strap Selection, for appropriate strapping information.

2.8.1 MODEM CONNECTIONS

Modems, which may be registered or nonregistered, connect to the unit via two rear panel 25-pin EIA connectors and four screw terminal VF connections as follows:

2.8.1.1 Connections For MP 96, MP 96RP, MP 144, MP 144A or MP 160 Modems

1. Install AA connector and internal cable assembly (819-3044-8011) within MP 96, MP 96RP, MP 144A, or MP 160 modem. (See Figure 2-8.) Install AA Option CCA (859-3419-5X61) within MP 144 modem.

2. Strap modem for TX power output of -1dBm.

3. Connect supplied 25-conductor cable (835-3564-1011) between modem AA connector and auto answer unit AA connector.

4. Connect 25-conductor cable supplied with terminal equipment from DTE to modem DTE connector.

NOTE

Do not connect modem TXVF and RXVF lines to the auto answer unit MODEM VF terminals. These signals are carried through the AA cable.

2.8.1.2 Connections For All Other Modems

1. Strap modem for TX power output of -1dBm. For MPX modems, also strap SW-0 enabled.

2. Connect supplied 25-conductor cable (835-3564-1011) between modem DTE connector and the MODEM connector on the auto answer unit.

3. Connect modem TXVF and RXVF lines to the auto answer unit MODEM VF terminals with supplied VF cable (034-0012-0031). No polarity reference for the TX pair and the RX pair need be observed.

4. Connect 25-conductor cable supplied with terminal equipment from the DTE to the auto answer unit DTE connector.

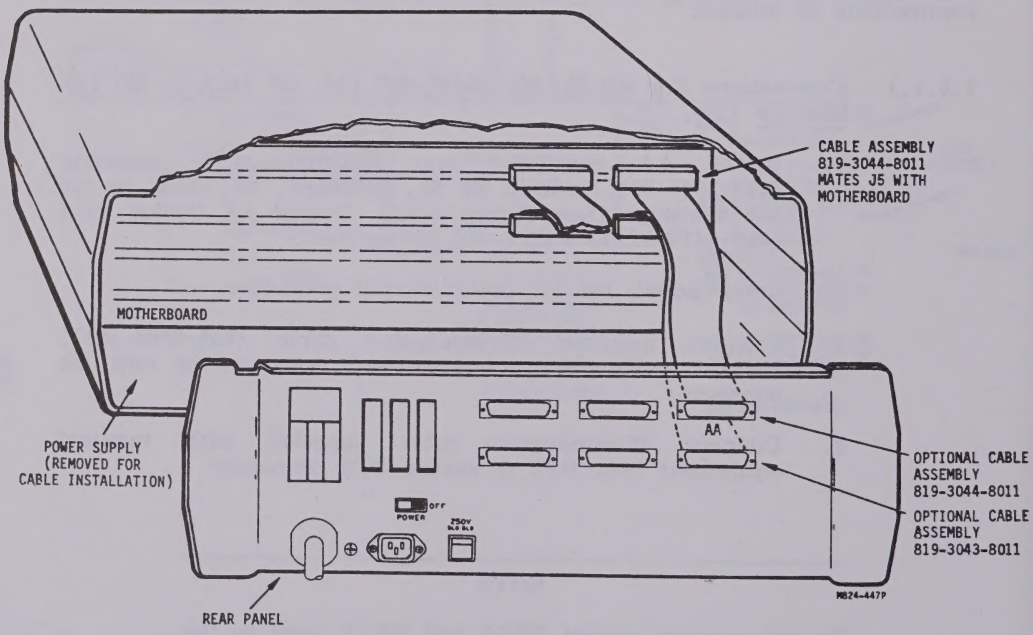


Figure 2-8. MP 96, MP 144A, and MP 160 Internal AA Cable Installation

2.8.2 TELEPHONE SETS

Two telephone sets are required with units located where calls are originated. The telephone sets and connecting cables must be furnished by the telephone company. When telephones are ordered, the exclusion key and switch hook indication options as listed below must be specified on the service order. The telephone cables must be terminated with 8-position modular plugs. The cables plug into the auto answer unit at rear panel jacks labeled PHONE #1 and PHONE #2.

The ordering code for telephones provided for use with data equipment is USOC (Universal Service Ordering Code) RTC. Either a 503C or a 2503 telephone will be provided. Both phones have exclusion keys. The 503 has a rotary dial; the 2503 has touch-tone dialing.

Several telephone options must be specified when telephones are ordered. Available options are listed below in Table 2-8, with phone company codes (A1 through D8) and descriptions. For correct operation of the auto answer unit, options A2 and D8 must be specified. The B and C options are user choices.

Table 2-8. Telephone Options

Telephone Options	Usage
A1 Telephone set controls line	Not used
A2 Data set controls line	Mandatory
B3 Aural monitoring not provided	User's choice
B4 Aural monitoring provided	User's choice
C5 Touch-tone telephone set	User's choice
C6 Rotary dial telephone set	User's choice
D7 Switch hook indication	Not used
D8 Voice mode indication	Mandatory

To assure correct operation of option D in the event of variations from one telephone company to another, refer to the following table for the required action of the mode indication leads (MI, MIC).

Table 2-9. Mode Indication (MI, MIC) Leads

Phone Condition	Mode	Mode Indication Contacts (Telephone Connector Pins 3 & 6)
On Hook	Data Mode	Open
Off Hook, Exclusion Key Down	Data Mode	Open
Off Hook, Exclusion Key Up	Voice Mode	Closed

It is important to note that the cables furnished with the telephones for connection to the network are not identical to those furnished with the auto answer unit. Mixing these cables could produce undesirable results. The telephone cables transpose the connections from one end to the other, i.e., pin 1 is wired to pin 8, pin 2 to pin 7, pin 3 to pin 6, etc. The data cables furnished with the unit are wired differently. Be sure that the telephone cables are always used for the telephone interface and that the data cables are always used for the auto answer unit to network interface. Keying on the plugs should prevent plugging a network cable into a telephone jack, but not vice versa.

2.8.3 SWITCHED NETWORK CONNECTIONS

The unit is designed to operate in one of three modes as specified by the FCC Rules, Part 68, Section 68.308.

1. A Programmable configuration in which the maximum TX level at the jack is determined by means of a resistor located in the telephone company-provided data jack. The level can be programmed in 1 db steps from 0 db to -12 db, with respect to one milliwatt, using resistor values specified in section 68.502(e) of the FCC Rules. This programming is done by the telephone company installer.

2. A Permissive configuration in which the maximum TX level at the jack may not exceed -9 db, with respect to one milliwatt.

3. A Fixed Loss Loop (FLL) configuration in which the maximum TX level at the jack may not exceed -4dB, with respect to one milliwatt.

In all three cases, connections to the dial network are made at the DL #1 and DL #2 connectors on the rear of the unit. Different interface cables are required for Permissive, FLL, and Programmable operation, as discussed in the following paragraphs.

2.8.3.1 Permissive Configuration

If the Permissive configuration is used, the following data jack arrangement must be specified to the telephone company:

Bridged T/R 6-position keyed data jack, USOC RJ11C, with RJ36X miniature 8-position series jack.

In the Permissive configuration, the unit TX Manual Attenuator must be strapped for 9 db attenuation, and the Programmable Attenuator must be disabled. This is standard strapping for the unit as shipped from the factory. The modem must be strapped by the installer for -1 dBm to ensure that the level limiter does not actuate. With this strapping, the TX power at the wall jack is guaranteed not to exceed -9 dBm and is nominally -10 dBm.

Two supplied cables, 125-0025-0031, are used for permissive connections to the wall jacks. Although the DL #1 and DL #2 jacks on the unit are 8-position jacks, the 6-position modular plug of the permissive cables also mates with these jacks.

2.8.3.2 Programmable Configuration

If the Programmable configuration is used, one of the following data jack arrangements must be specified to the telephone company:

- Bridged T/R 8-position keyed programmed date jack, USOC RJ45S, with RJ36X miniature 8-position series jack.

- Bridged T/R 8-position keyed universal data jack, USOC RJ41S, with RJ36X miniature 8-position series jack. The switch on the RJ41S jack must be placed in the "programmed" position.

In the Programmable configuration, the unit TX Manual Attenuator must be strapped for 0 db attenuation, and the programmable attenuator must be enabled. The modem must be strapped by the installer for -1 dBm. With this strapping, the TX power at the wall jack is guaranteed not to exceed 0 dBm, and is nominally -1 dBm. This power is reduced by the wall jack programming resistor by an amount determined by the telephone jack installer.

Option cables 125-0021-1431 are used for programmable connections to the wall jack. This cable is wired one-to-one, nontransposing, between connectors on each end.

It is important that the telephone company install the above data jacks with the correct Tip and Ring polarity at the jack contacts. Otherwise, touch-tone telephones may not function properly. Some telephones do not have an internal polarity guard. The polarity must be such that the Tip (pin 5) is positive with respect to the Ring (pin 4). Correct polarity can be verified quickly by plugging the telephone into the data jack and dialing a number. If the dial tone can be broken and the number dialed, the polarity is correct. If the dial tone cannot be broken when any number is dialed, the polarity is reversed at the data jack and the telephone company must reverse the Tip and Ring connections within the data jack.

2.8.3.3 Fixed Loss Loop Configuration

If the FLL configuration is used, the following data jack arrangement must be specified to the telephone company:

- Bridged T/R 8-position keyed universal data jack, USOC RJ41S, with RJ36X miniature 8-position series jack. The switch on the RJ41S transmit circuit jack must be placed in the "FLL" position. The switch on the receive circuit jack must be placed to the "programmed" position to avoid attenuation of the receive signal.

In the FLL configuration, the TX Manual Attenuator must be strapped for 4 dB attenuation, and the programmable resistor disabled. The modem must be strapped for -1 dBm. With this strapping, the TX power at the wall jack is guaranteed not to exceed -4 dBm and is nominally -5 dBm.

Option cable 125-0029-1431 is used for FLL connections to the transmit circuit wall jack. This special cable transposes pins 4 and 5 on one end with pins 1 and 2 on the other to interface with the FLL connection. Option cable 125-0021-1431 is used for connection to the receive circuit wall jack. This cable is wired one-to-one and interfaces with the receive signal at the RJ41S jack at pins 4 and 5. The receive circuit RJ41S jack must be switched to the "programmed" position.

As discussed earlier in section 2.6.4, the transmit circuit interface at the unit is DL #1 and the receive circuit interface is DL #2.

In the FLL configuration, the telephones must be plugged into the RJ36X wall jack and not the rear of the auto answer unit. This connection is necessary because the telephones must connect to the Tip and Ring ahead of the FLL attenuator pad to avoid attenuation of the touch-tone signals and voice signals.

2.8.4 LEASED LINE CONNECTIONS

Connections to the leased lines are made at the rear of the unit at the 4-screw terminal board labeled LEASED LINE. The transmit pair connects to the TX terminals and the receive pair connects to the RX terminals. The TX and RX pairs are balanced lines, and no polarity reference need be observed.

2.9 OPTION SELECTION AND STRAPPING SYMBOLOGY

Paradyne circuit card assemblies (CCA's or cards) that include optional circuit configurations have built-in strapping features. These straps are usually selected at installation and remain in place until the system is reconfigured. The strapping method employed is multiple-position miniature switches (DIP switches).

In this manual, strap options for the circuit card assembly are described with numbered paragraphs for each strap function.

Additionally, a strapping instruction figure is provided for the card. The figure contains the following strapping aids:

- A nonscale drawing showing the relative location of each miniature switch.
- A nonscale drawing of each miniature switch showing the standard and mandatory setting for each switch segment.
- Tables summarizing the strapping, the standard setting, and the paragraph reference for each strap function.

The miniature switch occupies a dual inline package (DIP) component location on the card. The switch location can be grid referenced by the row and column numbers etched on the outer edge of the card. Two types of miniature switches are used: rocker and slide. (See Figure 2-10.) The slide switch is the more common type, and is marked "ON" for the on or closed position.

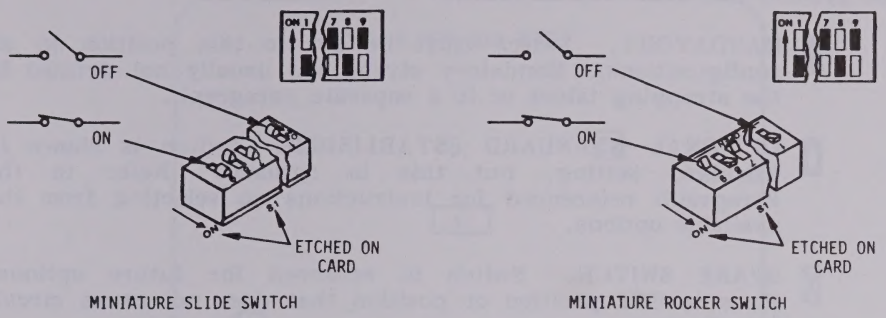


Figure 2-9. Miniature Switch Marking and Identification

The ON direction is indicated by the word "ON", silk-screened on the card adjacent to one end of the switch. This identification ensures proper alignment for strapping, regardless of the type of switch used. In the strapping tables, all miniature switches are referred to as either "ON" or "off" for each possible strap option.

All strapping references to these switches are generally written in terms of a switch segment, e.g., S1-4 of which "S1" identifies the switch number etched on the card and drawn on the schematic diagram, and "-4" identifies the fourth switch segment as marked on the switch. Miniature switches usually comprise 2, 4, or 9 segments. Strap functions may involve any number of segments (from one or more switches) which are grouped together in the strapping tables. Each strap function is only summarized in the strapping tables, but is fully described in a separate, numbered paragraph as listed in the "PARA" column of the table. Standard strapping is indicated by an arrow next to a switch setting or group of switch settings in the strapping tables.

NOTE

Standard strapping is defined as configuring the device in its most probable mode of use. The manual identifies recommended standard strapping; however, strapping may vary depending on equipment interface and peculiarities of the operating environment. Refer to strap descriptions for other alternatives that can be adopted for specific applications.

When the device leaves the factory, it is usually configured in final test according to the recommended standard strapping indicated in the strapping tables. The device is NOT CONFIGURED TO THE USER'S SYSTEM REQUIREMENT; therefore, strapping must be carefully selected during installation to satisfy user requirements. As an additional aid, each miniature switch is shown in Figure 2-12 with symbols to illustrate the recommended and mandatory strapping for the device.

The symbols are described as follows:

- ■ MANDATORY. Switch must be set to this position in all configurations. Mandatory straps are usually not defined in the strapping tables or in a separate paragraph.
- ▯ OPTIONAL--STANDARD ESTABLISHED. Switch is shown in Standard setting, but this is optional. Refer to the Paragraph referenced for instructions on selecting from the available options.
- ▨ SPARE SWITCH. Switch is reserved for future options. Place to OFF position or position that does not cause circuit interference.

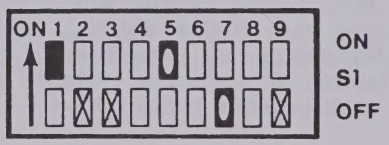


Figure 2-10. Miniature Switch Strapping Symbols Example

2.10 MANDATORY STRAPS

The unit contains one mandatory strap. Strap S6-1 (TX Power Limiter) must be off. All straps are illustrated in Figure 2-11 and discussed in Paragraph 2.12, Strap Descriptions.

2.11 OPTION STRAP SELECTION

DIP switch straps are used to configure or reconfigure the unit with minimum time and effort. Strap locations, standard settings, and functions are shown in Figure 2-11.

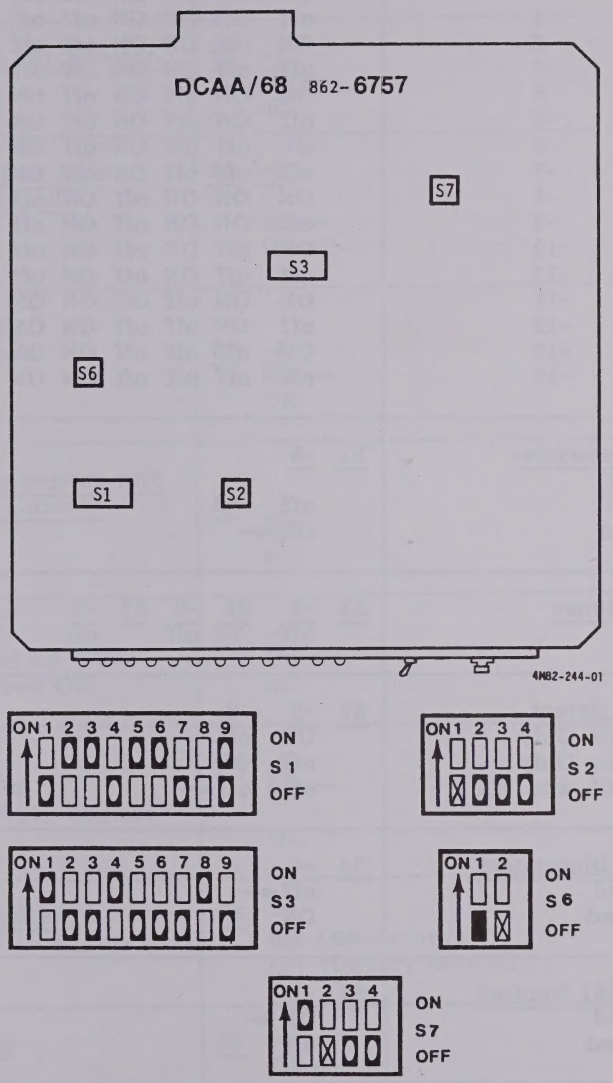


Figure 2-11. Circuit Card Strapping Instruction (1 of 3)

FUNCTION	SWITCH SETTING (STD←)	PARA
TX Manual Attenuator		
dBm	S1 -1 -2 -3 -4 -6 -7 -8 -9	1
0	ON ON ON ON off off off off	
-1	off ON ON ON off off off ON	
-2	ON off ON ON off off ON off	
-3	off off ON ON off off ON ON	
-4	ON ON off ON off ON off off	
-5	off ON off ON off ON off ON	
-6	ON off off ON off ON ON off	
-7	off off off ON off ON ON ON	
-8	ON ON ON off ON off off off	
-9	off ON ON off ON off off ON ←	
-10	ON off ON off ON off ON off	
-11	off off ON off ON off ON ON	
-12	ON ON off off ON ON off off	
-13	off ON off off ON ON off ON	
-14	ON off off off ON ON ON off	
-15	off off off off ON ON ON ON	
TX Programmable Attenuator	S1 -5	2
Enable	off	
Disable	ON ←	
Spare Switches	S2 -1 S6 -2 S7 -2	
	off off off	
Dial Tone Detect	S2 -2 -3	3
TX Line Only	ON off	
RX Line Only	off ON	
Both TX and RX	off off ←	
Dial Tone Disconnect	S2 -4	4
Enabled	off ←	
Disabled	ON	
LSD (MP 96) Monitor	S3 -1	5
Enabled	ON ←	
Disabled	off	
RTS (MP 96) Monitor	S3 -2	6
Enabled	ON	
Disabled	off ←	

Figure 2-11. Circuit Card Strapping Instructions (2 of 3)

FUNCTION	SWITCH SETTING (STD←)	PARA
RTS (Non MP 96) Monitor Enabled Disabled	S3 -3 ON off←	7
LSD (Non MP 96) Monitor Enabled Disabled	S5 -4 ON← off	8
Disconnect Upon Loss of RTS and/or LSD Enabled Disabled	S3 -5 off← ON	9
60-Second Call Sequence Timer Enable Disable	S3 -6 off← ON	10
Automatic Disconnect with Loss of Line Current Enabled Disabled	S3 -7 ON off	11
DTR Control Controlled by DTE DTR Forced ON	S3 -8 ON← off	12
DSR Control Forced On Follows Auto Answer Seq.	S3 -9 off← ON	13
TX Power Limiter Enable Disable	S6 -1 off (Mandatory) ON (factory test only)	14
AAIN Control Enabled Disabled	S7 -1 ON← off	15
EDLOW Output Select 0 to +8V Level TTL Level Disable	S7 -3 -4 ON off off ON off off←	16

Figure 2-11. Circuit Card Strapping Instructions (3 of 3)

2.12 STRAP DESCRIPTIONS

1. TX MANUAL ATTENUATOR. This circuit provides manual attenuation of the modem transmit signal to the dial lines. It does not affect the transmit signal to the leased lines.

   Normally, the TX attenuation is set during installation to correspond to the power level requirement at the point of installation.

2. TX PROGRAMMABLE ATTENUATOR. This circuit enables or disables the programmable attenuator. When enabled, the programmable attenuator function provides 0 to 12 db attenuation of the TX signal power by selected resistors in the telephone wall jack. When disabled, the programmable attenuator is fixed at 0 db.

   Strap this circuit disabled unless programmed data jacks are used.

3. DIAL TONE DETECT. Dial tone disconnect must be enabled for this circuit to function. This circuit monitors the transmit and/or the received lines for the presence of a dial tone during data transfer.

   Strap this circuit to monitor both the transmit and the receive line unless local conditions dictate otherwise or false dial tone detection is suspected.

4. DIAL TONE DISCONNECT. When enabled, this circuit automatically disconnects the modem from the dial lines if a dial tone is detected during a dial line data transfer. When disabled, the dial tone detect circuit is inhibited.

   If this circuit is enabled, strap the dial tone detect circuit to monitor the RX and/or TX lines.

5. LSD (MP 96) MONITOR. When enabled, this circuit allows the selection of LSD for activity monitoring by an auto answer unit connected to an MP 96 type modem.

   This circuit can be enabled in conjunction with the RTS (MP96) Monitor circuit to provide activity monitoring of both LSD and RTS.

6. RTS (MP 96) MONITOR. When enabled, this circuit allows the selection of RTS for activity monitoring by an auto answer unit connected to an MP 96 type modem.

   This circuit can be enabled in conjunction with the LSD (MP 96) Monitor circuit to provide activity monitoring of both RTS and LSD.

7. RTS (Non-MP 96) MONITOR. When enabled, this circuit allows the selection of RTS for activity monitoring by an auto answer unit connected to a non-MP 96-type modem.

   This circuit can be enabled in conjunction with the LSD (Non-MP 96) monitor circuit to provide activity monitoring of both RTS and LSD.

8. LSD (Non-MP 96) MONITOR. When enabled, this circuit allows the selection of LSD for activity monitoring by an auto answer unit connected to a non-MP 96 type modem.

   This circuit can be enabled in conjunction with the RTS (non-MP 96) monitor circuit to provide activity monitoring of both LSD and RTS.

9. DISCONNECT UPON LOSS OF RTS and/or LSD. When enabled, this circuit provides for an automatic disconnect from the dial lines 15 seconds after loss of activity on the selected signal(s). If the signal(s) selected for monitoring are not raised within 15 seconds after the initial dial lines' connection, this circuit automatically disconnects and switches the modem back to leased lines. Disabling this circuit inhibits the disconnect function and does not allow a disconnect on the loss of RTS/LSD, regardless of the choice of signal(s) monitored for disconnect.

   If either RTS or LSD activity is not to be monitored, the monitor circuit must be disabled, or else the circuit disconnects 15 seconds after connection to the dial lines.

10. 60-SECOND CALL SEQUENCE TIMER. When enabled, this circuit monitors the off hook status of both dial lines. If the line 1 telephone circuit goes off hook for more than 60 seconds without line 2 going off hook, this circuit times out and resets all latches and relays in the timing circuits. Line 2 cannot go off hook unless preceded by an off hook condition on line 1.

    Enable this circuit for normal operation. Disable primarily for test purposes.

11. AUTOMATIC DISCONNECT WITH LOSS OF LINE CURRENT. When enabled, this circuit provides a disconnect on loss of dial line dc current after the two calls have been established. If a loss or dropout lasting 400 ms or longer occurs, the dial lines are disconnected and the modem switches back to leased lines.

    Enable this circuit unless local conditions dictate otherwise.

12. DTR CONTROL. This circuit provides for control of DTR by the DTE or for DTR to be internally forced on. If DTR control by the DTE is selected, this circuit causes a disconnect when DTR goes low for six ms or longer.

Enable this circuit unless local conditions dictate otherwise.

13. DSR CONTROL. This circuit provides two modes of DSR control. DSR is either forced on constantly, or DSR is forced off until two seconds after the modem is switched to dial lines.

    Strap this circuit to force DSR on for normal dial back-up operation. For dial only operation, DSR should follow two seconds after the dial line switchover.

14. TX POWER LIMITER. When enabled, this circuit monitors the TX VF power input, and if the power level exceeds 0 dBm for a predetermined period of time, the TX output level is attenuated to prevent exceeding specific power output limits. When disabled, the TX power limiter is inoperative.

15. AAIN CONTROL. When this circuit is enabled, a TTL low at the AAIN input, J3-23 (AA connector), causes a disconnect. When disabled, AAIN control is defeated, and AAIN cannot cause a disconnect.

    Enable this circuit unless local conditions dictate otherwise.

16. EDLOW OUTPUT SELECT. This option provides an EDLOW signal of two different voltage characteristics at the MODEM EIA connector pin 22. EDLOW is provided for modems which do not automatically switch receivers to the most sensitive setting when switching from leased to dial line operation. Either a signal characteristic of 0 to +8 Vdc (+8V TRUE) or a TTL signal (0V TRUE) is made available. When this circuit is disabled, the connection to pin 22 is open circuited.

    Strap this circuit disabled for MP 96, MP 144, and MP 160 modems, or if EDLOW is not used.

NOTE

EDLOW is a nonstandard EIA signal at connector pin 22. Verify that modem is specially wired to accept the EDLOW signal at pin 22. If so, determine which signal characteristic is compatible with modem. If modem is not wired to accept the signal on pin 22, disable EDLOW Output Select.

Strap this circuit for TTL when interfacing with a MPX family modem.

2.13 POWER APPLICATION AND SYSTEM CHECKOUT

Before installing and operating the auto answer unit, verify that all associated equipment and the installation site meet recommended installation requirements listed below:

1. Ensure correct polarity of Tip and Ring dc voltage at telephone company wall data jacks. Tip (pin 5) must be positive with respect to Ring (pin 4).

2. Ensure that the correct fuse is installed.

3. Ensure that basic modem straps are set for four-wire operation.

4. Ensure that the modem is strapped for -1 dBm TX power output.

5. Ensure that unit and modem strap options are set to customer configuration.

6. Ensure that unit manual attenuator is strapped for correct power output level.

7. Install signal cables as shown in Figure 2.6 or 2.7. If the unit is used with an MP 96, MP 96RP, MP 144, or MP 160 modem, the modem must have an internal cable (P/N 819-3044-0011) installed between motherboard connector J5 and AA connector rear panel cutout.

8. Ensure that correct choice of three data cables connect between DL #1 and DL #2 and the wall jacks.

9. Check that power connector/signal connectors are plugged in securely. Ensure that all other mechanical/electrical installation prerequisites have been accomplished.

10. Perform turn-on instructions described in Paragraph 3.3.

CHAPTER 3
OPERATION

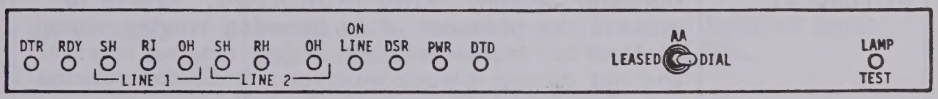
3.1 GENERAL

This chapter contains auto answer unit operating instructions, including a discussion of front panel controls and indicators and their functions, normal operation indications, system operating procedures, and limited maintenance procedures. Once the unit is properly installed and powered on, it operates automatically without operator intervention.

Throughout this chapter, reference is made to Line 1 and Line 2. Line 1 refers to the dial line connection to the modem TX output, and Line 2 refers to the dial line connection to the modem RX input.

3.2 CONTROLS AND INDICATORS

All operator controls and indicators are located on the lower front panel attached to the circuit card assembly. The following information describes the function of each control and indicator. (See Figure 3-1.)



NAME	DESCRIPTION
DTR	Indicator, green. DATA TERMINAL READY. Lights to indicate that the DTE has sent DTR to the modem and to the DCAA/68, indicating that it is ready to communicate through the modem. DTR must be in to enable the DCAA/68 in either the transmitting or receiving configuration.
RDY	Indicator, green. READY. Lights to indicate that all conditions are ready for normal DCAA/68 operation; i.e., DTR is lit and no conditions for a disconnect are present. When RDY is out, the DCAA/68 forces the modem VF interface to leased lines.
SH (Line 1)	Indicator, green. SWITCH HOOK. Lights to indicate that Line 1 telephone handset is off hook and exclusion key is up. Indicator goes out when the telephone is on hook.

Figure 3-1. Controls and Indicators (1 of 3)

NAME	DESCRIPTION
RI (Line 1)	Indicator, red. RING INDICATOR. Lights to indicate the presence of an incoming ringing signal on Line 1. Indicator is lit during ringing interval and out during silence interval. Indicator is lit for only on ring since the DCAA/68 answers and goes off hook immediately after the first ring.
OH (Line 1)	Indicator, green. OFF HOOK. Lights following either SH (Line 1) indicator lighting or RI (Line 1) indicator lighting. The lit condition of the OH (Line 1) indicator indicates that the DCAA/68 has gone off hook on Dial Line 1, has seized the line, and is ready for data communications over Dial Line 1.
SH (Line 2)	Indicator, green. SWITCH HOOK. Lights to indicate that Line 2 telephone handset is off hook and exclusion key is up. Indicator goes out when the telephone is on hook.
RI (Line 2)	Indicator, green. RING INDICATOR. Lights to indicate the presence of an incoming ringing signal on Line 2. Indicator is lit during ringing interval and out during silence interval. Indicator remains out after DCAA/68 answers the call.
OH (Line 2)	Indicator, green. OFF HOOK. Lights after OH (Line 1) and either of the following is lit: • SH (Line 2) • RI (Line 2) The lit condition of OH (Line 2) indicates that the DCAA/68 has gone off hook on both dial lines (1 and 2), that it has seized the lines, and that it is ready for data communications over both line.
ON LINE	Indicator, green. Lights to indicate Dial Lines 1 and 2 have both gone off hook in the proper sequence, and a two-second period of silence has passed, after which the modem VF interface has been switched from the leased line circuit to the dial lines.
DSR	Indicator, green. DATA SET READY. Lights to indicate that the DCAA/68 is not inhibiting the DSR signal going from the modem to the DTE. When this indicator goes out, the DCAA/68 is intercepting DSR from the modem to the DTE. (See also description of Strap S3-9 in Strapping Instructions)

Figure 3-1. Controls and Indicators (2 of 3)

NAME	DESCRIPTION
PWR	Indicator, green. POWER. Lights to indicate the presence of +5V, +12V, and -12V dc voltages within the DCAA/68. The lit condition, however, does not indicate that these voltages are within their tolerance limits.
DTD	Indicator, red. DIAL TONE DETECT. Lights to indicate that dial tone is detected on either Line 1, Line 2, or both lines. This detection of a dial tone immediately causes the DCAA/68 to disconnect from the dial lines unless the disconnect is defeated by a strap option (Strap Sf2-4).
LEASED/AA/ DIAL	Toggle switch, 3-position. LEASED/AUTOMATIC ANSWER/DIAL. Set to AA for normal auto answer operation. The other two positions are for testing or for special conditions, causing the DCAA/68 to force the modem interface to either LEASED or DIAL lines. The LEASED and DIAL positions override all connect sequences and disconnect signals.
LAMP TEST	Pushbutton, momentary. Press to light all front panel indicator lamps for test of LEDs.

Figure 3-1. Controls and Indicators (3 of 3)

3.3 TURN-ON INSTRUCTIONS

CAUTION

THE UNIT IS POWERED ON WHEN THE POWER CORD IS PLUGGED INTO THE AC POWER SOURCE (105 to 125 VAC). BE CERTAIN THAT THE UNIT IS FUSED WITH A 1/4A, 250V SLO BLO FUSE.

Connect the power cord to a 115V ac power outlet. The PWR indicator should light immediately to indicate the presence of all dc voltages, i.e., +5V, +12V, and -12V. If the PWR indicator does not light, press the LAMP TEST button. If all LED's light, +5V is present, but either the +12V, -12V, or both are absent. Check dc voltages or exchange for another unit. If none of the LED's light, +5V is not present. Check the ac power cord, the ac power source, the ac power fuse (located on the lower rear panel), and the three dc voltages. If the ac interface is good, but +5Vdc is still absent, exchange for another unit.

3.4 NORMAL OPERATING INDICATIONS

Once the unit is properly installed and connected to the modem according to Chapter 2 and the turn-on procedure is completed, the unit is ready for operation. An operator is required at the calling end to manually place the two dial calls, but answering is fully automatic at the receiving end.

Green LED indicators reflect normal operation. They light as the signals they represent are active. The red DTD indicator is off during normal operation.

3.5 SYSTEM OPERATING PROCEDURES

With the system configured according to Figure 2-6 or 2-7 and optional straps in the desired positions, the unit is ready to operate. An operator is required at the calling station to begin the two-call sequence. The DTE must provide DTR before a call can be originated or answered. The LEASED/AA/DIAL switch on both the calling and the answering auto answer units must be in the AA position. Also, DTR, RDY, and, PWR indicators must be lit at both stations and must remain lit throughout the data transfer.

3.5.1 ORIGINATING A CALL

The following steps must be performed to originate a call:

1. Lift the Phone #1 handset and pull up the exclusion key. Phone #1 now controls Dial Line #1 on the calling end. SH (Line 1) and OH (Line 1) indicators light at the calling auto answer unit.

2. With Phone #1, dial the number of Line #2 at the receiving end, listen for the ringing signal, then set Phone #1 handset aside. Do not hang up. At the receiving end, the RI (Line 2) indicator light goes on and off as the line rings. Line 2 does not answer at this time.

3. Lift Phone #2 handset and pull up the exclusion key. Phone #2 now controls Dial Line 2 on the calling end. SH (Line 2) indicator lights at calling unit.

4. With Phone #2, dial the number of Line #1 at the answering end; listen for a ring signal and the click of Line #1 going off hook. RI (Line 1), OH (Line 1), and OH (Line 2) indicators now light at the answering unit. Two seconds after OH (Line 2) lights, ON LINE lights. DSR also lights at this same time (if not strapped for DSR Forced ON).

5. Hang up Phone #1 handset, then Phone #2 handset, in that order. OH (Line 2) now lights at calling unit. SH (Line 1) and SH (Line 2) go out. Two seconds later, ON LINE and DSR (if DSR is not strapped for DSR Forced On) light.

The transfer from leased to dial lines is now accomplished, and data transfer can begin.

3.5.2 DISCONNECT OPTIONS

The system remains connected to the dial lines until commanded to disconnect by one of several conditions:

1. Loss of DTR.

2. Loss of AAIN.

3. Loss of RTS and/or LSD for 15 seconds or longer (if strapped for optional monitor).

4. Loss of dial line dc current (if strapped for optional monitor).

5. Detection of dial tone (if strapped for optional monitor). Internal circuitry monitors for either the "old" dial tone of amplitude modulated 600 Hz or the "new" precise dial tone of 350 Hz and 440 Hz. This factory-adjusted circuitry requires no field adjustments or selection by the user or installer and will respond automatically to either dial tone. This circuit is immune to ANALYSIS FSK tones.

6. Manual operation of LEASED/AA/DIAL switch to LEASED position.

The auto answer units on each end of a data circuit operate independently of each other and only recognize control and command signals generated at their respective end. Consequently, one end can disconnect from the dial lines without a simultaneous disconnect occurring at the other end. Two methods for coordinating a disconnect on both ends follow:

1. Both DTE's can coordinate the dropping of DTR.

2. Both ends can be strapped to monitor only LSD (as opposed to monitoring both LSD and RTS). When the auto answer unit at one end disconnects, the other end no longer receives data. When the receiving unit senses the loss of LSD, it disconnects after 15 seconds. If both RTS and LSD are monitored, one end can hold the line by its own RTS signal even though the other end may have disconnected (either by intent or due to a fault), and LSD has thus dropped. In this event, the first unit does not disconnect until 15 seconds after its own RTS has dropped.

3.5.3 MODEM ENERGY DETECT THRESHOLD

The MP 96, MP 96RP, MP 144, and MP 160 modems energy detect threshold level automatically changes from -26 dBm to -48 dBm (or most sensitive level) whenever the auto answer unit switches the modem from leased to dial lines. When the auto answer unit is used with the MP 48, LSI 96, M 96, T 96, LSI 24 or MPX modems, the modem energy detect level must be optioned to the most sensitive setting for correct modem operation, unless the modem is wired to accept EDLOW (SW on MPX) at the modem connector, pin 22. See Paragraph 2.12, Strap Description 16.

3.5.4 TX SIGNAL POWER LIMITATION

A level-sensing circuit monitors the input TXVF signal to the auto answer unit whenever the TX transmission path is connected to the switched network. If the input power level from the modem exceeds 0 dBm when averaged over a 3-second interval, a limiting circuit is activated and a 13 db loss is automatically inserted in the transmission path. This prevents the unit output power levels from exceeding specified limits. The limiting circuit remains activated as long as the TX input signal exceeds 0 dBm. No harmonic distortion is introduced during limiting. The input power level must fall below -1 dBm to deactivate the limiting circuit.

Because the level-monitoring circuit senses input power levels in excess of 0 dBm, the modem TXVF signal to the unit should be strapped to -1 dBm within the modem. This strapping provides an adequate margin of safety from the automatic limiting threshold. With the input power level at -1 dBm, the auto answer unit output to the network is a maximum of -1 dBm. For the specified output level of -9 dBm, as with the permissive mode, the unit should be strapped for 9 db attenuation. If strapped for 9 db attenuation, the unit output to the network is a nominal -10 dBm (with the input level at -1 dBm). For the specified

output level of -4 dBm with the FLL mode, the unit must be strapped for 4 dB attenuation. With the input level at -1 dBm, the output to the network is a nominal -5 dBm.

The signal power limiter is removed from the circuit when the auto answer unit transmission path is connected to leased lines.

3.6 TURN-OFF INSTRUCTIONS

To turn power off, simply remove the ac power cord from the ac power outlet. The PWR indicator and other unit status/performance indicators turn off. The VF connections are forced to leased lines when power is removed.

3.7 ERROR RECOVERY PROCEDURES

There are no error recovery procedures for the unit. However, coordinate in a timely and orderly manner any turn-off and subsequent turn-on with the other station in the communications network.

3.8 CHANGE IN OPERATING CONFIGURATION

If reconfiguration of the auto answer unit becomes necessary, consult Chapter 2, Installation, to verify that proper interface connections are made, that transmitter power level is correct, and that strap switches are in appropriate positions.

3.9 MAINTENANCE

Maintenance of the unit consists of limited corrective maintenance and periodic preventive maintenance procedures.

3.9.1 CORRECTIVE MAINTENANCE

Corrective maintenance must be limited to direct replacement of the unit. Federal Communications Commission regulations require that repairs be performed only by the equipment manufacturer or his authorized agent.

3.9.2 PREVENTIVE MAINTENANCE

No special preventive maintenance is required to maintain the auto answer unit in good working order when it is operated in a clean location, free from extremes of temperature, humidity, and vibration.

If any of these environmental extremes is present, the following periodic preventive maintenance procedure is recommended:

1. Inspect front panel switch movements for damage.

2. Inspect interface cables and power cord for cuts, cracks, chaffing, or other physical damage.

3. Remove top from unit and inspect the circuit card for accumulation of dust or dirt.

4. If the circuit card is very dirty, clean it with a soft, long-bristle brush, i.e., a one-inch paintbrush.

5. Verify that the four internal cables are plugged in correctly and securely on the circuit card.

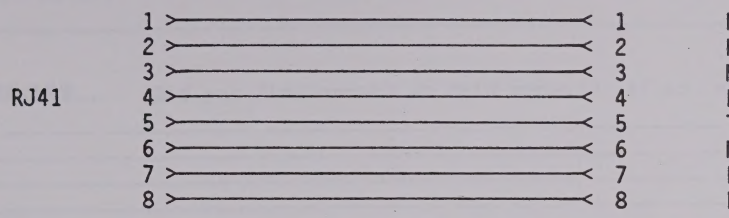
6. Replace the top of the unit and perform system checkout procedures.

APPENDIX A

DESCRIPTION OF DCAA PHONE CABLES

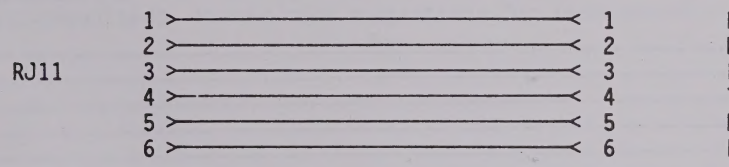
1. PROGRAMMABLE CABLE, 125-0021-1431
COLOR: GREY

8-PIN KEYED
DCAA DL-1,2



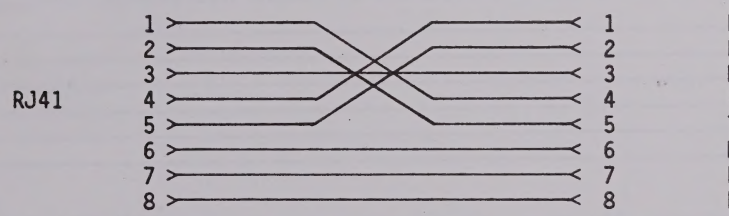
2. PERMISSIVE CABLE, 125-0025-0031
COLOR: GREY

6-PIN UNKEYED
DCAA DL-1,2



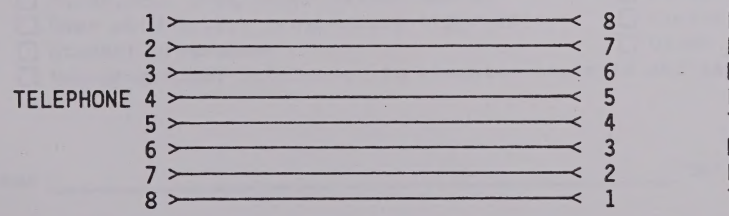
3. FIXED LOSS LOOP (FLL) CABLE, 125-0029-1431
COLOR: BLACK

8-PIN KEYED
DCAA DL-1,2



4. TELEPHONE CABLE, 125-0030-0831
COLOR: GREY

8-PIN UNKEYED
DCAA PHONE 1,2



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PARADYNE Technical Update Memo

No.: 862-6757-M20-02

Date: November 20, 1984

Affected Document: 862-6757-M20
Dual Call Auto Answer/68
Standalone Unit Model 4712
Installation and Operation Manual

Prerequisites/Previous Updates to Document: 862-6757-M20-00 (10/83)
862-6757-M20-01 (7/84)

PURPOSE OF TECHNICAL UPDATE MEMO

This Technical Update Memo releases a reprint of the affected document. This document incorporates any updates or revisions to the previous edition for the purpose of reprinting the document. This document provides the necessary and most current information for installing and operating the Dual Call Auto Answer/68 Model 4712 at the time of this reprint.

SUMMARY OF PREVIOUS TECHNICAL UPDATE MEMOS

- Technical Update Memo 862-6757-M20-00 (10/83), released a final edition.

- Technical Update Memo 862-6757-M20-01 (7/84)

    1. Corrected a part number omission.
    2. Corrected a callout and usage error.
    3. Changed from Feature No. 4712-001 to Model 4712-01.

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